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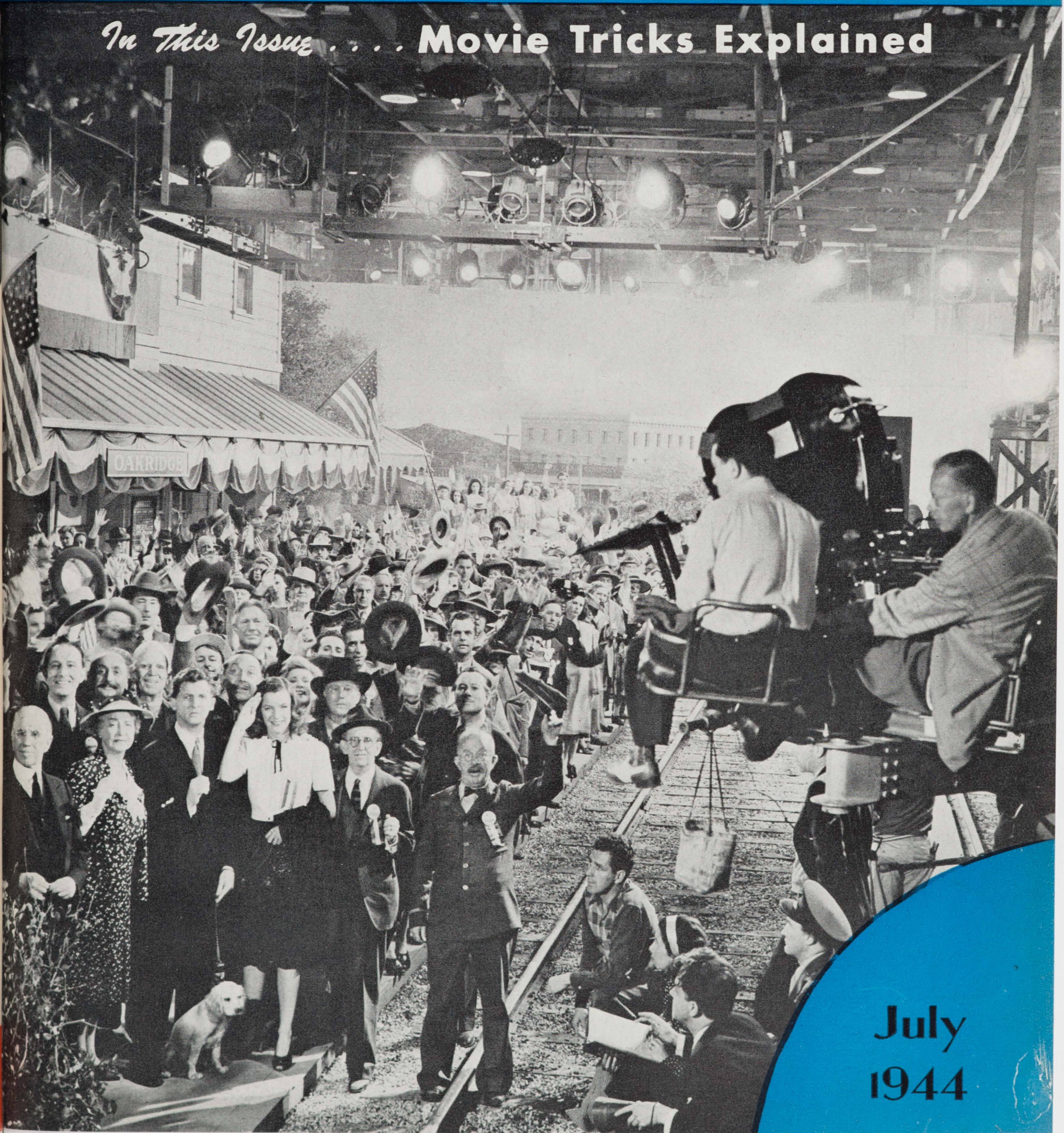
AMERICAN Cinematographer

★ THE MOTION PICTURE CAMERA MAGAZINE ★

In This Issue . . . **Movie Tricks Explained**



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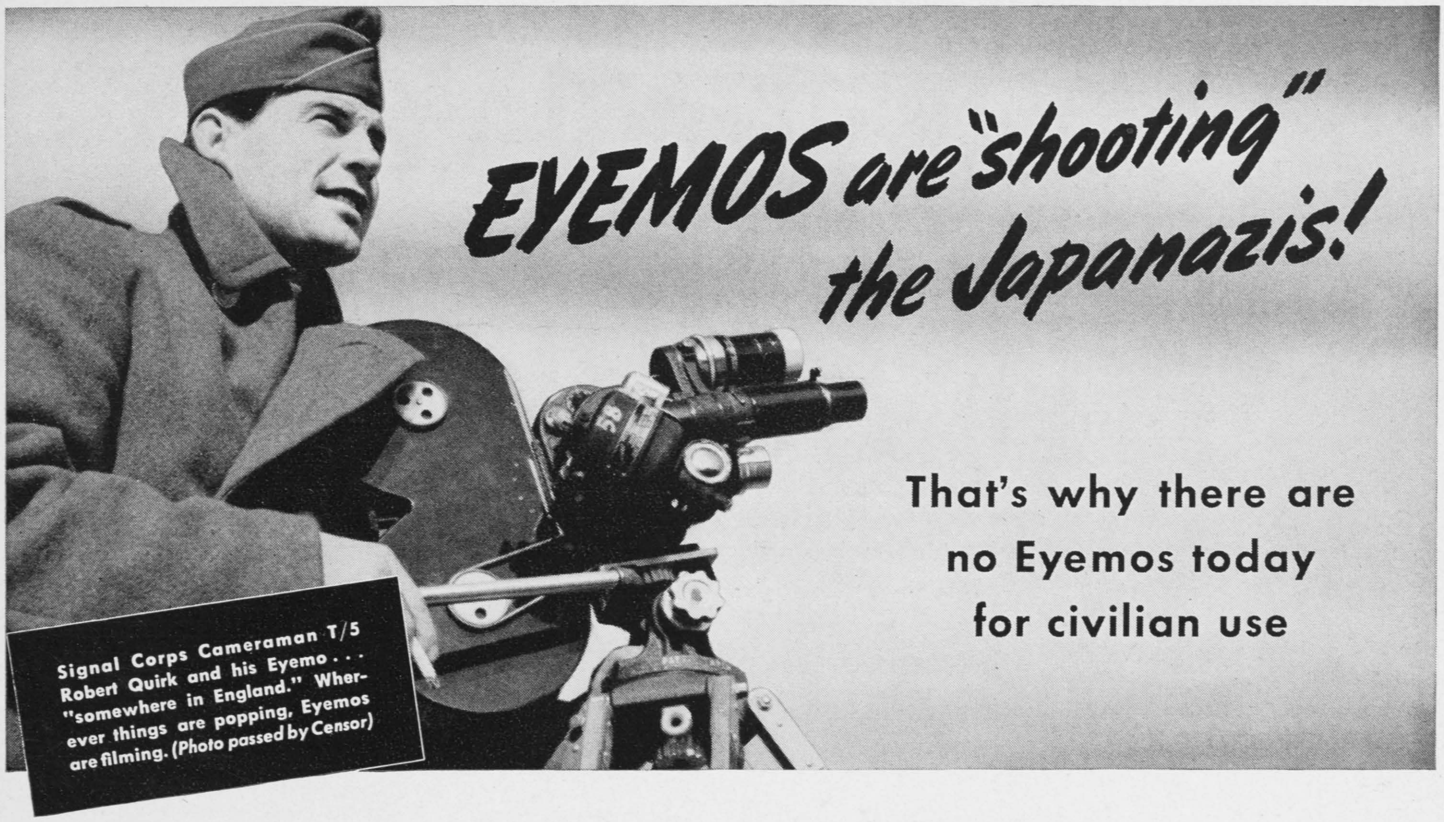

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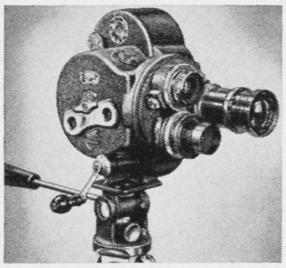

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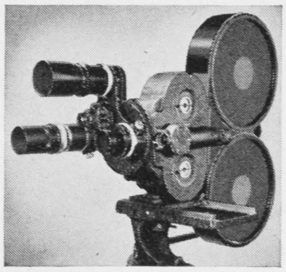

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AMERICAN CINEMATOGRAPHER

THE MOTION PICTURE **CAMERA** MAGAZINE

VOL. 25 JULY, 1944 No. 7

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THE FRONT COVER SHOWS a scene being taken during the filming of Paramount's "Hail the Conquering Hero." John Seitz, A.S.C. was Director of Photography on this picture.

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AUSTRALIAN REPRESENTATIVE
McGill's, 179 Elizabeth Street, Melbourne,
Australian and New Zealand Agents

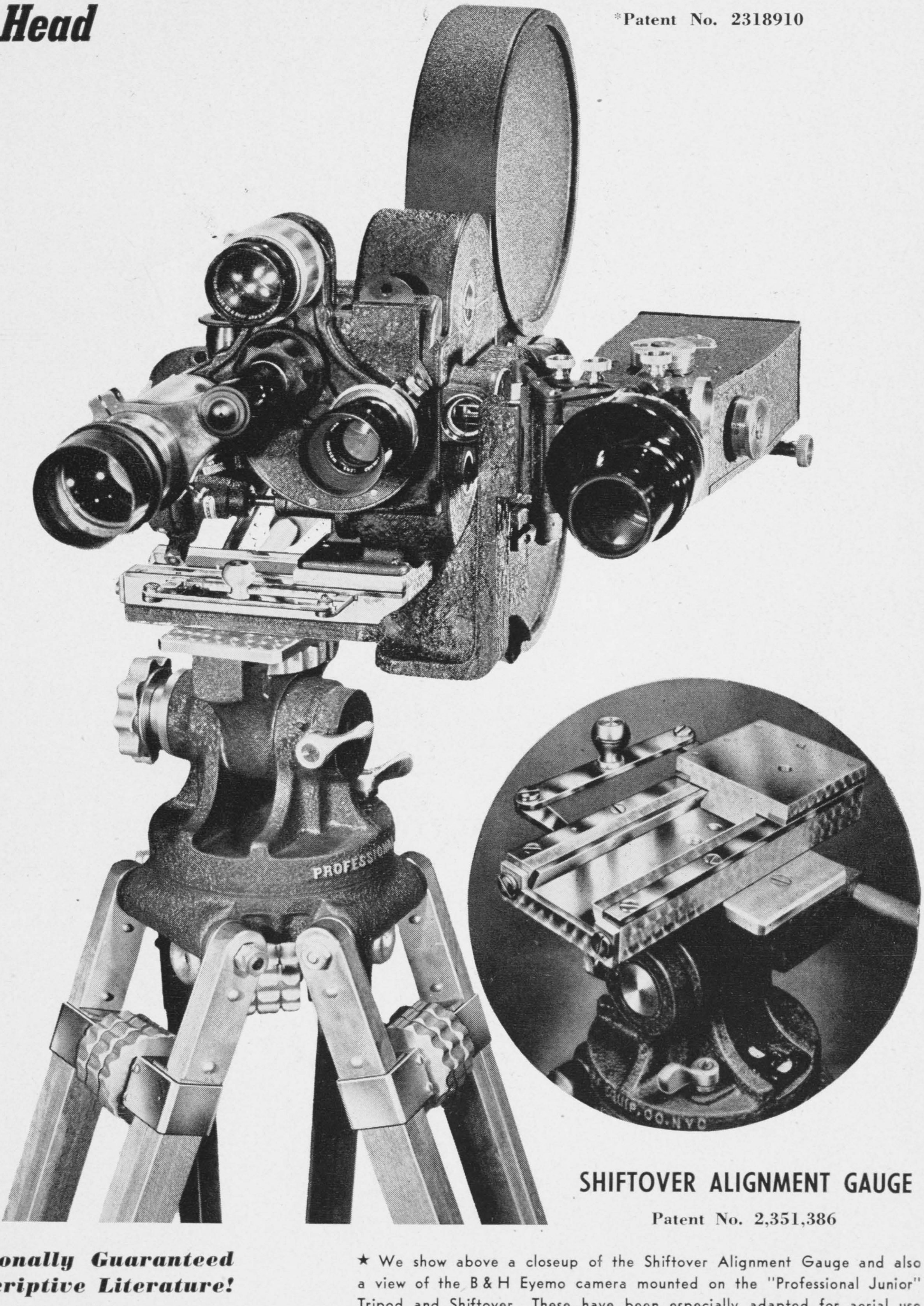
Published monthly by A. S. C. Agency, Inc.
Editorial and business offices:
1782 North Orange Drive
Hollywood (Los Angeles, 28), California
Telephone: GRanite 2135

Established 1920. Advertising rates on application. Subscriptions: United States and Pan-American Union, $2.50 per year; Canada, $2.75 per year; Foreign. $3.50. Single copies, 25c; back numbers, 30c; foreign, single copies 35c, back numbers 40c. Copyright 1943 by A. S. C. Agency, Inc.

Entered as second-class matter Nov. 18, 1937, at the postoffice at Los Angeles, California, under the act of March 3, 1879.

"PROFESSIONAL JUNIOR"* TRIPOD
with Removable Head

*Patent No. 2318910



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★ We show above a closeup of the Shiftover Alignment Gauge and also a view of the B & H Eyemo camera mounted on the "Professional Junior" Tripod and Shiftover. These have been especially adapted for aerial use by the Office of Strategic Services, Field Photographic Branch, Wash., D. C.

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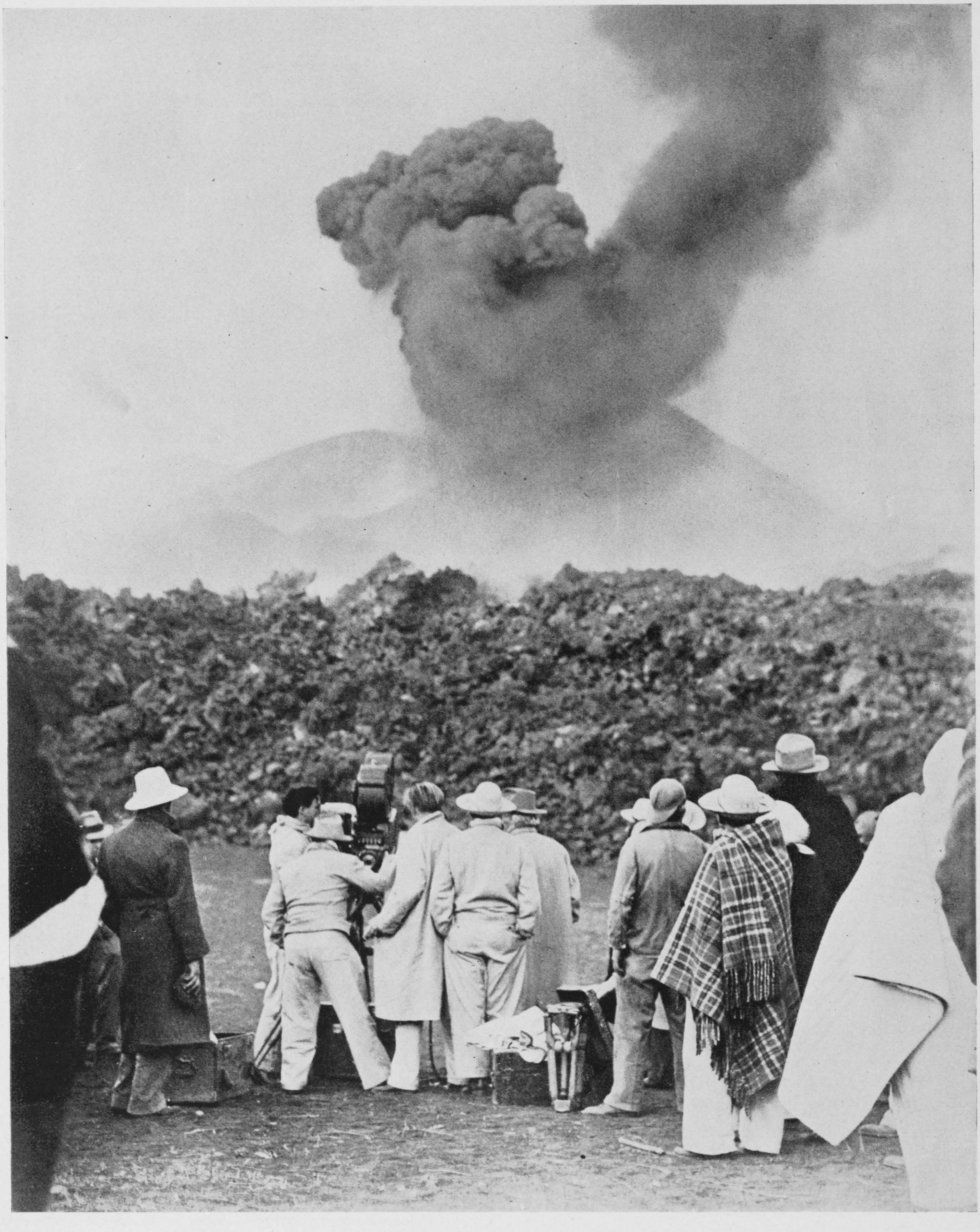
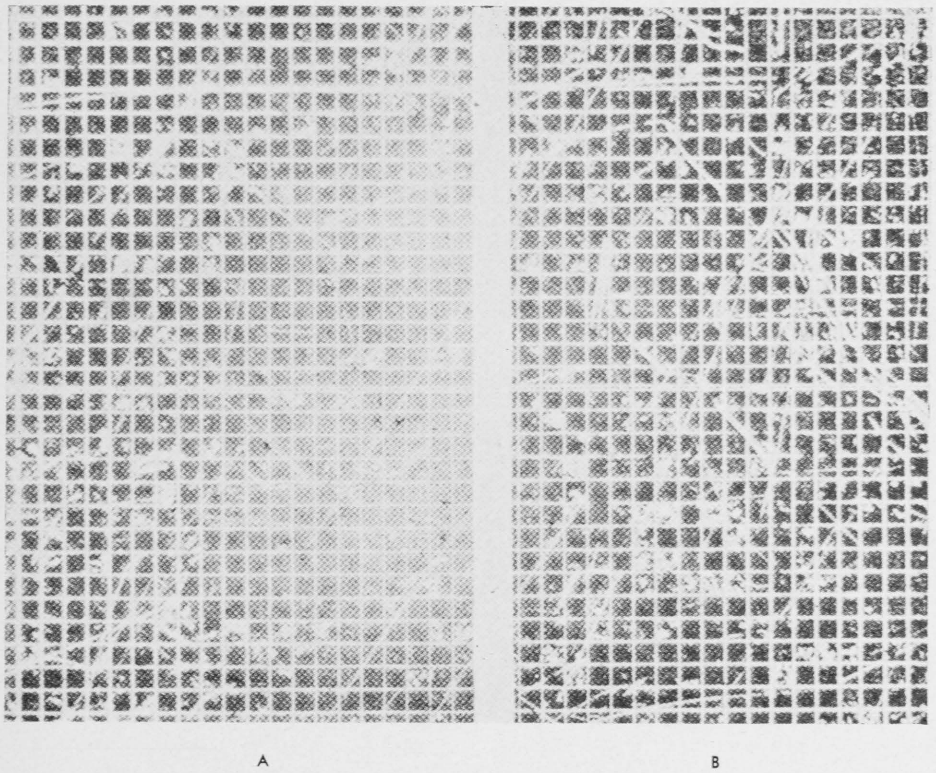
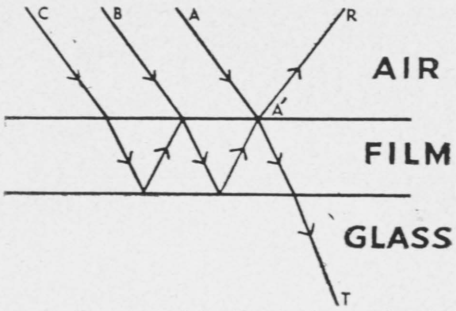
★ The Shiftover has a "stop-bracket" which prevents the camera from sliding off the dovetail base—and is provided with dowel pins which position it to top-plates of tripods having 3/8 or 1/4-20 camera fastening screw.



This striking photograph shows William Snyder, A.S.C., photographing the newly-risen volcano, Parangaricutiro, in Mexico, where they were filming scenes for "The Story of Dr. Wassell". The pictures of the volcano later were incorporated in the Gary Cooper starring film which was made by Paramount Pictures.





Above, Fig. 1. At left, Fig. 2. Photographs of a Test Obect taken with a 2in. f/1.5 lens, uncoated (A) and coated (B).

COATED LENSES

By K. M. Greenland, Ph.D., A.Inst.P.

IN STRIVING for a perfect optical system, the lens computer makes the most of the optical glasses available, and the glass-maker and the lens polisher do their best to meet the specifications of the computer. But there is one opposing factor over which they have very little control: that is the loss of light due to reflection at the surfaces of each lens. The number of reflecting surfaces in a system of lenses can be reduced by cementing together some of the surfaces, and this is done wherever possible, but there is an obvious limit to the application of that remedy.

The reflectivity of a glass-air surface is usually between 4% and 7½% according to the type of glass, so that the loss by reflection seriously reduces the brightness of an image if the lens system has several components. To make matters worse, a fraction of the reflected light from the high-lights of the object eventually reaches the image, where it invades the shadows and so reduces contrast. In certain cases the haze is even concentrated into flare spots and ghost images.

A method has now been developed for reducing the reflectivity of glass. Its principle is that the light entering or leaving a lens surface is reflected in two stages instead of all at once in such a way that the reflected components are mutually destructive.

This is achieved by putting on to the surface of the glass a thin transparent film so that there shall be two parallel reflecting surfaces—the glass-film boundary and the film-air boundary. The two sets of reflected rays so generated will annul each other is that they are equal in intensity but opposite in phase. They are made so, as nearly as possible, by correct adjustment of the thickness and refractive index of the film.

Principle of Anti-reflection Film

The method is an application of the principle of interference of wave motions. The light energy which no longer appears as reflected light is by no means lost. That would in any case be impossible, but in this case we find that it is restored to the transmitted beam with the happy result that the brightness of the image is increased.

Fig. 1 shows the action of a coating of anti-reflection film on a flat glass surface. *A'R* is a typical reflected ray and, as you can see, it is made up of a direct reflection from *AA'* and innumerable small additions through multiple reflections from other rays of which the first two, *B* and *C*, are shown on the diagram. Similarly the transmitted ray *AA'T* gets contributions from the same sources.

It would take to long to work out the conditions now, but it is a fact[1, 2] that, for normal incidence, if the thickness of the film is one-quarter of the wavelength of the incident light, then all the additions to the reflected ray from rays like *B* and *C* are in opposite phase to the direct reflection from *A* and all the additions to the transmitted ray are in phase with it. Furthermore, if the refractive index of the film is the square root of the glass, the combined amplitude of all the multiple-reflection components of *A'R* is equal to that of the component from *A A'*. As they are opposite in phase, the result is: no reflection. Under the same conditions the additions to the transmitted ray, being in phase with it, are just enough to make up for what it loses at the two boundaries of the film. (The diagram does not show all the rays to which *A*, *B* and *C* give rise. Each ray is partially transmitted and partially reflected at each boundary, but the rays not shown form part of other interference systems identical with this one.)

The effect of a quarter-wave film of the right refractive index is therefore to allow a ray perpendicular to the surface to pass into the glass without reflection. The film would be equally effective if the ray were travelling out of the glass.

Without going into details, I can say that the same film criteria give almost complete elimination of reflection for angles of incidence up to about 20° so that the film is effective in converging or diverging beams and on the curved surfaces of lenses. Also, by making the film a little thicker, non-reflection can be obtained for particular angles of incidence up to 45°.

Heterochromatic Light

So far I have only dealt with monochromatic light. When white light falls on a film adjusted for non-reflection in, say, the yellow-green, the yellow-green component is fully transmitted and not reflected at all. For wavelengths further from the yellow-green there is some reflection and some reduction in transmission, but even in the violet and the red the reflection is very small. The reflected light is therefore a faint purple (which gives an anti-reflection film its characteristic appearance). The transmitted light is tinged with yellow-green, but this is only noticeable when the light passes through a train of coated lenses.

I have taken this example with the maximum transmission in the yellow-green, because such a film gives the greatest effect over the whole of the visible spectrum. If maximum transmis-

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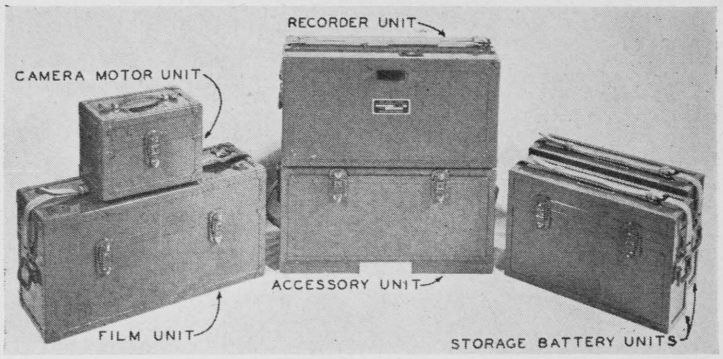


Left, Fig. 1. Above, Fig. 2.

PH-346-A Recording Equipment

By WESLEY C. MILLER

Chief Engineer, Sound Department,
Metro-Goldwyn-Mayer Studios

THE greatly increased motion picture production demands occasioned by the war found the armed services in the position of being unable to secure a completely portable 35mm. double film sound recording system from the usual supply sources. In July, 1942, the United States Army Pictorial Service of the Signal Corps, wishing to take advantage of the operating and design experience of the motion picture studios, requested the Research Council of the Academy of Motion Picture Arts and Sciences to undertake the design and construction of such equipment. A committee was set up under the Research Council organization with the writer as chairman. However, as it subsequently turned out, virtually the entire conception and responsibility for the project remained with the writer as an individual. Fortunately it was possible to undertake the work in the Metro-Goldwyn-Mayer Sound Department so that the advice and experience of many interested individuals became available.

The project was undertaken by the Research Council on its usual nonprofit basis and the only engineering costs directly charged to the work were those relating to actual drafting and physical work. The contractual relationships were subsequently modified so that the Stephens Manufacturing Company of Los Angeles became the prime manufacturing contractor, with the Research Council and the writer continuing in their responsibility for the design and for engineering supervision of the manufacture.

The primary need was for a limited number of units for immediate service by the Signal Corps. In the meantime other branches of the armed forces have shown an interest in the potentialities of the equipment. Keeping in mind the war time demand every attempt has also been made to have the equipment capable of permanent use by planning later modification for even greater flexibility. At relatively slight cost and complication it can be adapted to record nearly any of the conventional types of sound track, it can be arranged for synchronous or interlock operation for stationary use and at the same time retain its desirable portability features. Its post war possibilities for commercial studio use have been apparent to studio technicians who have examined it.

The first four units are now in service and have been approved by the Army Pictorial Service. An example of its use in the field is shown in Figue 1.

Portability and Quality Requirements

The requirement was a film recording channel which would operate with or without a camera and which would be as small, compact and light as practicable and be capable of relatively high quality work. Mechanical construction to withstand field operation, ease and reliability of operation by relatively inexperienced personnel and provision for simple and adequate maintenance were also of importance.

The equipment was to be capable of use wherever the double system, that is, sound and picture made on separate machines, was required. The first models were to be designed for use with the Mitchell NC type 35mm. camera with, however, the expectation that later adaptations would be made to accommodate other types of cameras, either 16mm. or 35mm. 35mm. standards were specified for the sound recording with the added provision that 16mm. film should be accommodated if possible, with however, the provision that the 16mm. film and its sound track should conform to 35mm. 90 foot per minute standards insofar as film travel and sound track width and location were concerned.

For purposes of portability and film economy this use of 16mm. can be of advantage without sacrificing the benefits of the 35mm. sound quality. However the original requirement has since been changed and the Army Pictorial Service requires only the 35mm. adaptation, although the 16mm. use may fill a need elsewhere.

Figure 2 shows the complete equipment which consists of the following units:

1. Recorder unit, containing all of the operating parts of the complete recording channel, such as film drive, amplifier system, controls, etc. . . . weight 93 pounds.

2. Accessary unit, which carries the various accessories required, such as microphone, head phones, cables, spare parts, etc . . . weight 60 pounds with normal spares and accessories.

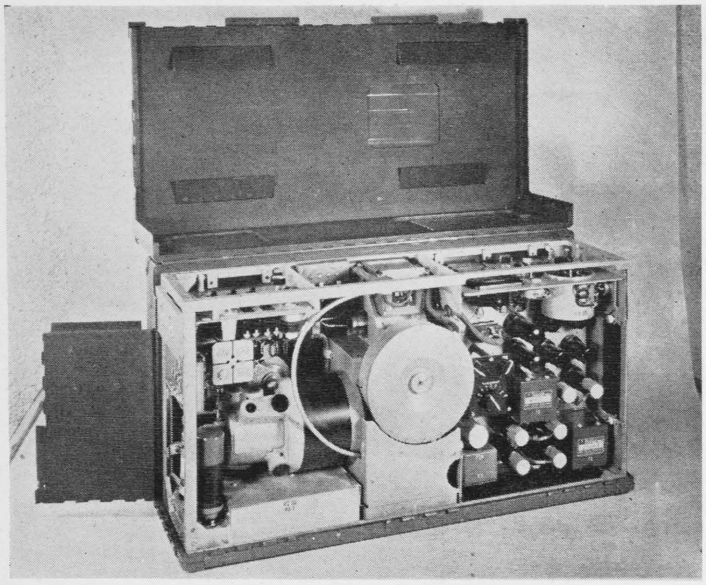
3. Film unit, which carries the film supply and all accessories relating directly to the use and handling of film. It carries a maximum of 6000 feet of 35mm. film, or a somewhat greater amount of 16mm. film . . . weight 40 pounds complete with all usual accessories, but without film.

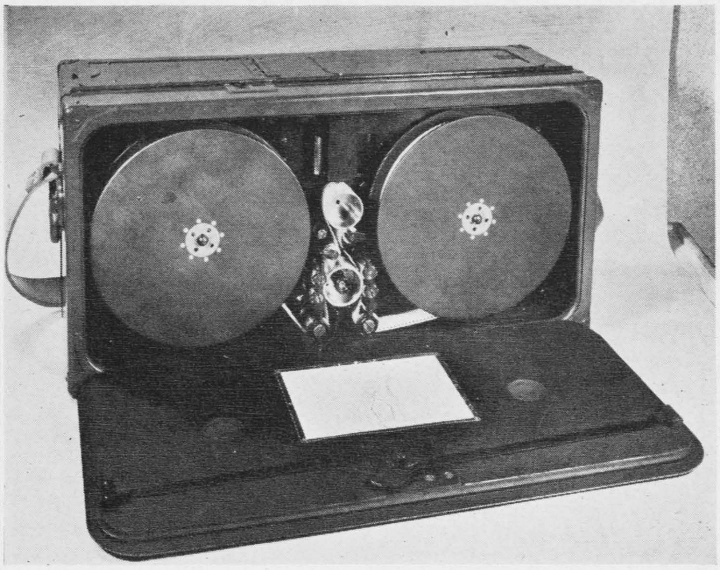
4. Two storage battery units, which are the entire battery supply for the complete equipment, including the camera motor. Each is a 24 volt, 45 ampere hour battery and weighs 87 pounds. The units may be used separately or together.

5. Camera motor unit, which consists of a carrying case and camera motor for the Mitchell NC type camera. Total weight of motor and carrying case, 24¾ pounds.

Thus the complete equipment weighs approximately 392 pounds without film. For particular uses where weight must be further reduced, less film may be carried and certain of the accessory equipment temporarily eliminated. The bare minimum weight for sound recording only, using one one-thousand foot roll of film is slightly under 200 pounds.

The recorder unit, accessory unit and film unit are all of the same outside dimensions, namely 10″ x 26″ x 13″ and the storage batteries are considerably smaller. Each unit can quite readily be carried by one man or a small crew can manually transport the entire equipment over considerable distances. For use on shipboard, airplanes or where space is at





Top left, Fig. 3. Top right, Fig. 4.

a premium and handling is difficult the package sizes are very useful.

In spite of these reductions in weight and size, the sound quality obtainable with the equipment very closely approximates the general average of commercial sound recording. Picture quality and results are entirely dependent upon the camera and its operation, as the only purpose which the recording equipment serves in this connection is to provide a means of driving the camera in synchronism with the recorder. In this respect the drive is identical with that provided for studio location purposes.

Recorder Unit

The recorder unit is the heart of the equipment. It contains the entire recording channel except for microphones, head phones and battery.

The film compartment in the front houses the film movement and the galvanometer and also serves as a film magazine during operation. A rear compartment readily accessible by opening the rear cover, houses the driving motor, amplifier and all of the miscellaneous equipment required to complete the recording channel. Control panels are located in the top of the box with all of the voice controls, such as the mixer, volume indicator, meter switches, etc. at the operator's left, and a power panel controlling the motor systems at the right. The case is constructed in such a manner as to make all of the various elements quickly and easily accessible while at the same time being of sufficiently sturdy construction to withstand the kind of treatment which it is apt to get under field conditions. Figures 3 and 4 show two views of the recorder unit.

Figure 5 shows the control panels in the top of the recorder unit box. When not in use these control panels are covered by doors which swing out of the way to make the control panels available for operation.

Film Drive

The film drive employes a single sprocket which acts as a combined pull-down and hold-back sprocket and a recording drum, which is controlled by a flywheel system of the rotary stabilizer type. The take-up clutch is mounted on the sprocket shaft and has provision for adjustment from the film compartment. The clutch drives the take-up spindle through a silent chain.

All of the various rollers associated with the film drive are mounted on a removable plate. To use either 35mm or 16mm film the proper plate is installed and the corresponding sprocket is placed on the sprocket shaft.

Film Handling

The conventional external magazine is eliminated in this design and a form of daylight loading technique has been adopted. Film as received from the supplier is loaded in the dark room onto a reel which is composed of two flanges screwed on either end of a hub. A cover is then placed over the loaded reel with three or four feet of threading leader brought out through a slot in the cover. In this condition the reel of film may be exposed indefinitely to daylight. To load a reel of film into the recorder, a film reel with its cover in position is placed on the feed spindle and all of the threading operations are carried on with the reel cover in position. When the threading is complete the reel cover is removed and the film compartment door is closed. Unloading is done in the reverse fashion, that is, the film compartment door is opened and a reel cover placed in position on the take-up reel. A loading bag is supplied which covers the entire recorder during the reel cover removal to prevent light striking the film.

It was the original intention that gray anti-halation film stock should be used. In this case the use of the loading bag was unnecessary except under extreme light conditions. However clear base film is now a standard in the Services so that the use of the loading bag is specified for all loading and unloading operations.

The film reel parts, loaded reels, film covers, film supply and loading bag are carried in the film unit, Figure 2. The use of this form of film reel and the elimination of the conventional magazine makes quite a saving in weight and size of equipment and offers no more difficulty in operation than in the use of 16mm. or Eyemo camera equipment.

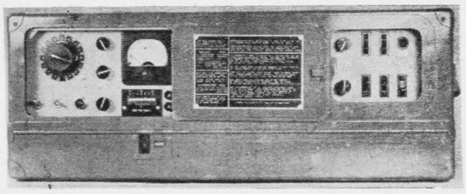


Fig. 5

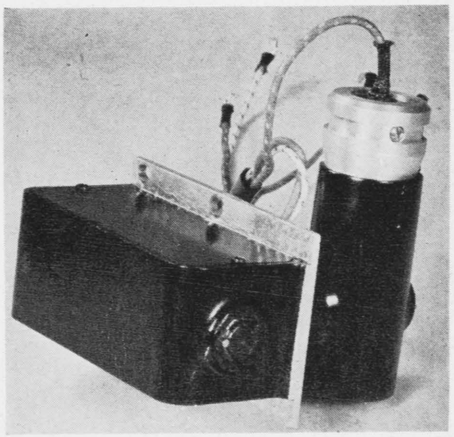


Fig. 6

Motor Drive System

Both recorder and camera driving motors are a special design of the conventional DC interlock type, operating from 24 volt direct current derived from the storage battery unit, with a three phase, 24 cycle, 110 volt interlock supply derived from auxiliary windings in each motor. The four pole recorder motor, which is an integral part of the recorder unit, operates at 1440 RPM. The two pole camera motor operates at 2880 RPM. Field rheostats controlling the speeds of the

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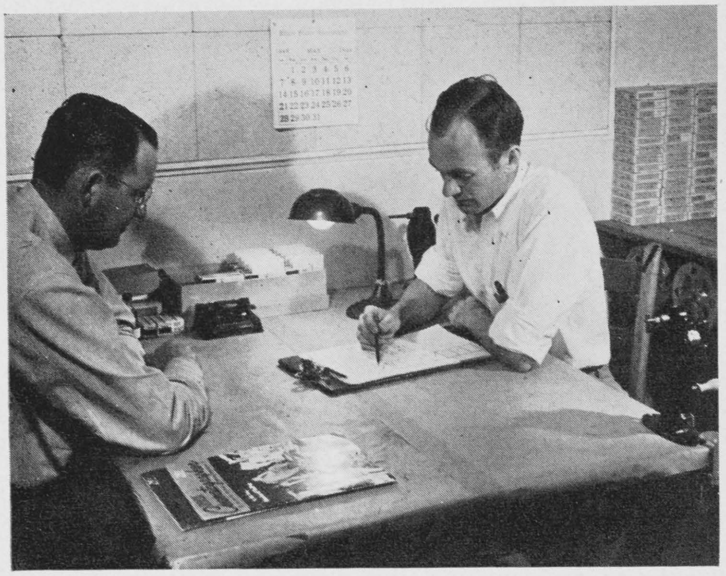

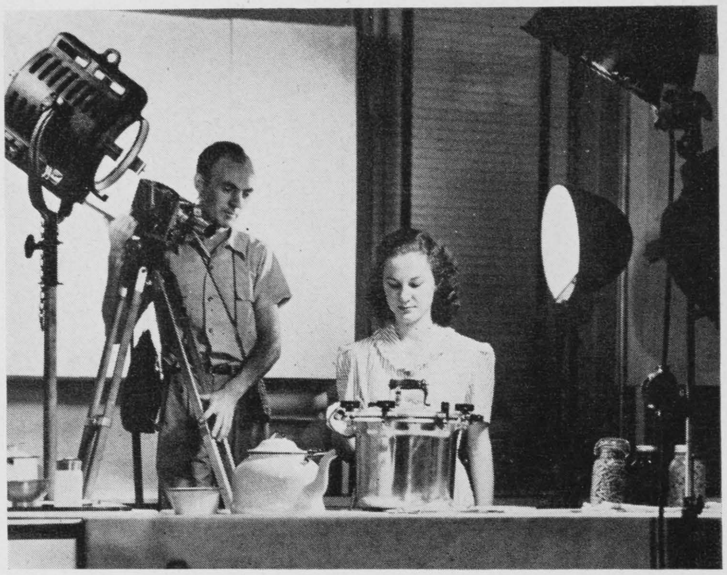

Left, a pre-shooting conference to outline the film.

Above, shooting a scene showing how to can vegetables. Scene at bottom of page shows cameraman photographing aerial dusting of a peach orchard.

Agricultural Motion Pictures In North Carolina

By DERMID MACLEAN

IN A recent issue of the AMERICAN CINEMATOGRAPHER there was an article about the U. S. Department of Agriculture's current motion picture program.

Producers of entertainment pictures may well wonder how the small staff available to the Department's motion picture division is able to turn out so many comparatively high grade pictures. A crew of five to record a sound sequence in the field does not give much play for anything but the most straight forward set-ups. The word "comparatively" is used, not in any derogatory sense, but just keeping in mind the smoothly flowing stories and technical excellence achieved through the combined efforts and "know-how" of a staff of fifty or a hundred, such as may be used on any important Hollywood production. Although perhaps the wonderful thing about Big Time picture making is how the producer ever coordinates the many individual jobs into one integrated whole.

But as the USDA is to Hollywood, so are some of the motion picture producing units in various colleges to the USDA. Some of these college units have been in existence many years; some may be operating on a shoe string compared to the endowments backing others; but most of them, though suffering from the common ailment of lack of help, are continuing their educational or research programs.

The Agricultural Extension Service of North Carolina State College is producing motion pictures of a similar type to those in the above mentioned article, but their staff is down to one man. The story, direction, photography, and cutting may sometimes grate on the senses of some of us who are technique conscious, but those pictures already produced are doing the job, and the audience for whom they were made are enjoying and profiting from them.

The background to this program started early in 1943 when Mr. Richard J. Reynolds, of Winston-Salem, offered the college the services of a director-photographer who was to make a series of motion pictures designed to show local (North Carolina) farmers how to increase and improve their crops or livestock. Subsistence farming had to be given a shot in the arm, so to speak, due to the fact that too many people were coming to town Saturday mornings, not with extra goods to SELL on the curb market, but with their carefully garnished savings to BUY canned goods. This also tied up very clearly with the post-war outlook on the food situation, both national and international.

Following a grateful acceptance of this gift to the State, the Extension Service called in its agricultural specialists and got them to vote on the relative importance of each and every subject that should be covered. Needless to say, not a single specialist thought his own pet subject should be second to any, but fortunately there were a few others present with less directed interests, and the resulting list of subjects lined up with Home Gardens (the farm equivalent of Victory Gardens) as of major importance. Then came such things as poultry, swine, oil crops, pastures, etc., with the request that, "we can make very good use of as many pictures as possible, as quickly as possible."

Enthusiasm ran high, a permanent assistant (and a very good man) was assigned, phone calls requested, "Can our picture be ready for a Grange meeting next month?", notes were left on the cameraman's desk as to picture possibilities,—impossibilities might have been a better word in some cases. Such a state of affairs is contagious and in a rash moment the promise was made that it might be possible to finish five pictures within the year. When the U. S. Navy stepped in and decided it had a better use for the "permanent" assistant, and the agricultural specialists had assignments that interfered with the weather varying shooting schedule, the promise turned out to be a particularly rash one.

Most agricultural subjects look their best following the last frost and before the scorching hot summer sets in,—April, May and June at the most. This left a couple of months open previous to April (and after the program was announced) so it was decided to start right away planning and shooting scenes on the value of the upkeep of farm machinery a winter subject in itself. The procedure outlined for this picture was followed in general by all the other subjects covered, although of course, each subject had its own set of problems and

each succeeding picture simplified the "modus operandi" of the following ones.

A rough story was first outlined and in due course agreed upon by all parties involved. A rough draft of the narration to accompany the story followed this. Then came the examination of the various possible sites and the selection of as many of them as were needed. Generally speaking, interiors calling for artificial light were eliminated entirely due to the lack of adequate wiring, and stage sets were out of the question because of a shortage of help and materials.

In all cases, site selection involved a number of problems both photographic and otherwise. Gasoline and tire rationing have tied down most of the shooting to within fifty miles of the base of operations, the State College. Unfortunate as it may be, some farmers do not cooperate fully with State and Federal workers, and cooperation is the keynote in undertakings of this type. (This is a situation that will undoubtedly be corrected to a large extent when a picture on this subject gets into circulation.)

At the final location chosen, the farm buildings and the farm family itself must be typical of the financial and social position of the audience at whom the picture is chiefly directed. All buildings shown must be built, within reason, according to Extension recommendations, unless of course they are to be pointed out as bad examples. And in every case where certain members of the farm were to be featured in the story, it had to be reasonably certain that they would be available any day upon arrival at the scene; (this proved to be such a stumbling block due to the lack of telephones and the changeable weather, that all future pictures are being planned keeping this fact very definitely in view, that is, eliminating personalities as far as possible).

Following agreement as to the various locations to be used, a shooting script was drawn up. A series of metamorphoses of scenes and sequences and scripts finally evolved one of a type that resulted in being not only practical for the motion picture department, but very intelligible to the various agricultural experts whose assistance was needed, some of whom found it hard to visualize the final effect of a number of disjointed and individually shot pictures. A standard long-leafed yellow scratch pad was ruled with one column of two-inch squares on the near left hand side. Each square represents a scene in the finished picture and in the order in which they will appear on the screen. In each square is a sketch of the set-up with the approximate camera and subject position, and to the right of each sketch is a description of the scene. The space to the left of the drawing is reserved for the cameraman's notes such as props, background, camera-angle, costume, and so forth. As each scene or sequence is shot, each sketch or page of sketches can be checked off.

Contrary to the general rule, each scene was not slated unless it happened to be one of a number of similar shots that might be hard to identify. Very little use was found for these markings due to the fact that the cutter had also been the director and cameraman and consequently knew each scene backward and inside out. The markings might have helped on a few occasional shots but the time consumed for the "actor" or the cameraman himself to go through the actual physical motion involved to incorporate this identification with every scene did not warrant the practice.

The procedure following the return of the developed film from the processing lab in Rochester was very simple and sufficient: each one-hundred foot roll

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Pictures on this page show cameraman making various scenes for his agricultural films.

was examined in a carefully cleaned up projector (the first of only two screenings allowed the original Kodachrome due to possible scratching). The contents of each roll were then listed on a standard 3½ by 5 inch filing card headed as Roll No. so-and-so, then Scenes No. such-and-such, Take No. 1, (or 2, or 3). Comments as to the best take and other information can be added to the card. No eliminations were made at this time except for false starts and obvious errors. As soon as all the pictures were in and time could be given to cutting, the rolls were re-examined on a viewer and n.g. or duplicate takes collected on a separate roll and filed away in the individual mailing boxes, with a description of the contents on each box. In this way these are available in case of a change of plans or for possible use in some other picture. The good takes were spliced up in cor-

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Aces of the Camera

Jackson J. Rose, A.S.C.

By W. G. C. BOSCO

ONE of the most striking things about the men who make up the membership of the A.S.C., men who work hard by day and frequently by night shouldering the tremendous responsibility that goes with their job of putting Hollywood's expensive productions on film, is that the hobby that fascinates the great majority of them, that takes most of their spare time away from the camera, is photography. It is a striking fact, and there is no doubt a moral to it; although it will not be the purpose of this article to point one out. But it will be clearly seen that jokes about sailors taking a boat out on the lake on their day off, or bus drivers riding to the end of the line on their own time would fail to draw a smile from these camera-happy chappies of the A.S.C.

This preoccupation with the camera and things photographic, on and off duty, marks the born cameraman. It is a trait that has directly and indirectly resulted in any number of refinements and improvements in equipment and technique that has blessed the industry as a whole. This was particularly true in the early days when most improvements were the result of the initiative of individual cameramen who almost certainly had to do much of the experimenting on their own time.

Jackson J. Rose, A.S.C., is an excellent example of the type of man who has that instinctive "feel" for photography, and making it his life work, has helped by his contributions over the last thirty-four years to reflect credit on the profession of which he is a member.

Jack came into the picture business via the old Essanay Company in Chicago when Harry Zech, A.S.C., hired him on the strength of his reputation as a commercial photographer. That was in 1910, and he stayed with that company until 1919. During that time he photographed the early Charlie Chaplin pictures as well as those split-reel epics featuring the great heart-throbs of the day, Francis X. Bushman, Bryant Washburn and Henry Walthall. But of greater distinction, particularly to cameramen, is that Jack used in 1912, the first 35mm. Bell & Howell Motion Picture Camera ever made; Bell & Howell camera number one. It was of all metal construction, had a very small collapsible upside-down finder, two lenses, a 2 in. and a 3 in. and a two-hundred foot magazine. Not quite what you would expect to find in a B & H camera today, but a tremendous improvement over the cumbersome old black boxes that had been breaking cameramen's backs as well as their hearts up until then. It opened Jack's eyes to what was possible in a motion picture camera, and some of the first improvements made on this early model, many of which are still in use, were the result of the suggestions made by him and his early associates at Essanay. The mattebox was one. The iris, which was first fitted and adapted to the camera from the iris of an old stage spot-light, was another.

Jack was always inventing something new, always adding some improvement to his camera. So much so that in its issue of December 8, 1917, the Motion Picture News was moved to say, among other things, that ". . . when he (Jackson Rose) goes out to shoot a picture it takes a brave actor to keep from running away from the machine; it looks so much like a Gatling gun." That they weren't exaggerating very much will be evident from the description of Jack's camera at that time, printed, not without awe, by one of the contemporary newspapers.

"The accompanying photograph shows what is said to be one of the most complete cinematograph outfits being used at the present time by any company in America. The camera with its attachments represents an outlay of $2000!

"The camera originally was made by Bell and Howell and is equipped with a 1000 ft. magazine; 32, 50 and 75mm. photo lenses and matched finders—6½ inch for telephoto work; collapsible sun shields for all lenses; lens markings accurately scaled from 6 ft. to infinity; 170 degree shutter; round closing diaphragm; square closing device; diamond shaped vignetting shutter; rising and falling curtain shutter (!!!); device to change focus of any lens while photographing; oval shaped sliding mash shutter; auxiliary aperture plate for marking dissolves; mask equipment of all shapes and sizes; footage recorder and picture counter which registers each individual picture; gear device to make any length dissolve or fade; tripod with automatic release for quick panoramic and up and down tilting motions."

That wasn't the only time Jackson Rose and his camera broke into print. The Chicago papers in 1917 carried a story that not only helps, in retrospect, to mark the difference between cameras of that day and this, but also the difference in a way of life. The story was variously headlined: "Witnesses Tell of Blind Man's Peep at Ankle." "Film Ankles Flash in Suit by 'Blind Man'." "Movie Shows Peter Zyla, Suing for $3500.00 for Loss of Sight, Coyly Focusing Optics on Hose."

It seems that one, Peter Zyla, was trying to collect for an alleged industrial accident, but the insurance company

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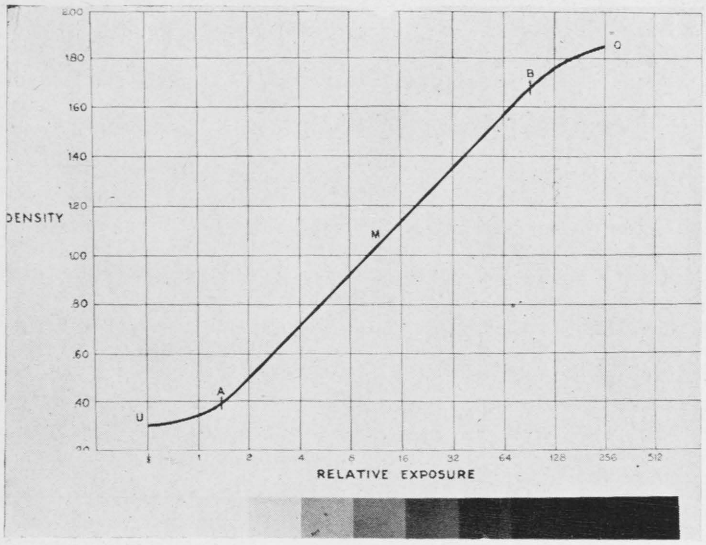

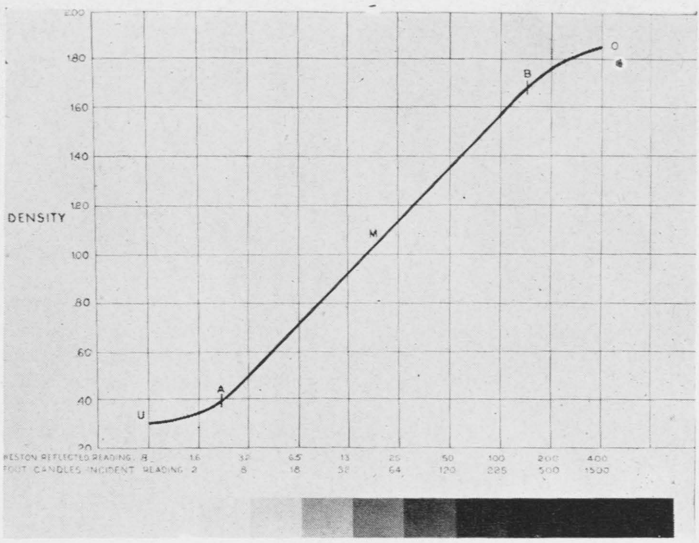

Upper left, Fig. 1. Right, Fig. 2.

Experiments by an Army Cameraman

By CAPT. THOMAS E. HUNT,

Army Air Corps

"ALL right, print that one," sings out the director. Another scene in the can, but a new set of problems is arising for the cameraman. Maybe it's a simple close-up to match the last medium shot, maybe it's a new and simple set to light, or maybe it's a complicated set requiring deep transparent shadows and brilliant bright lights. Whatever it may be, it will be approached in as many different ways as there are cameramen as each has his own method. Some call on their long experience to okay their set-up. Some use a meter to check. Some use both.

Photographic problems are not so serious in the professional motion picture studios as they are in the photographic departments of the present war-time army where you do not have either the time or the equipment of a studio to figure them out.

It was while I was stationed at Wright Field, where for a time I was head of the photography department, that I learned we would have to figure out a lot of problems for ourselves. One of these problems was keeping as accurate control as possible over difficult scenes. Searching for such control started me on a series of experiments. Several different ideas were tested and eliminated until one idea was found that seemed to have merit. Tests proved that the following method of control will work and give the photographer a reasonable accurate control over difficult scenes. Unfortunately, I was forced to stop before exhaustive tests could be made and as it seemed that there would be no opportunity to complete the experiments because of the lack of time and equipment, I decided to pass on the idea so that anyone who was interested could carry on their own tests.

As stated before, the purpose of the following article is to show one method of keeping a constant control over the set lighting so that all scenes will print in the close vicinity of one predetermined light. Under normal conditions, this is not difficult for a good photographer. However, it is for the abnormal or extreme conditions that this system was devised, and it is offered for what it is worth.

Every photographer knows that an exposure meter is not an open sesame to good exposure. On the contrary, it is merely a guide and as helpful as the photographer makes it. So it can be said about this method of scene control. It will serve as a guide to the cameraman and not as a set of hardfast rules. For example, later the statement is made that a key of 150 foot candles was found to be correct. It was correct for the test subject and for normal conditions as a person with average skin was selected for the test. However, it may not be correct for a girl with very light skin tones or a "heavy" with a dark complexion. If the photographer knows that a key of 150 foot candles is correct for normal conditions, then for lighter complexions, he may want to drop down, say to 125, or in the case of dark complexions, may raise his key to 175 or 200. The point is that when he knows what normal conditions are, then when he is confronted with abnormal conditions he has a starting point on which to base his decision. Therefore, when the reader studies the following, let him keep in mind that this system is not a set of hardfast rules but a guide that will lead him to a better understanding of a mechanical means of checking light balance.

Hunter and Driffield found that if densities are plotted against the logarithms of exposure, a characteristic curve results. This curve, known as H and D curve, varies with development and the type of emulsion.

A study of Figure No. 1 will show that the characteristic curve of a typical motion picture film starts out at the bottom as a curve, then goes into a straight line and then into another curve. The point between A and B is known as the straight line portion of the H and D curve and represents that portion of the film densities that is normally used. Any image placed by exposure on the straight line will be reproduced faithfully on the positive. An image placed on the curve between A and U will be underexposed (i.e., so thin it can't be printed, as shown by the gray scale in Figure No. 1) and conversely, any image placed on the curve between B and O will be too dense or overexposed.

Let's assume that the average 35mm. film has a tone range of 1/128. This means that the film will record from white to black in 128 steps. However, these tones will be recorded on the film in a geometric progression as 1 - 2 - 4 - 8 - 16 - 32 - 64 - 128. Let us assume that the lowest Weston reflected reading on a set is 6.5 and the highest reading is 50. This is a scene brightness or tone ratio of $\frac{6.5}{50}$ or approximately 1 - 8.

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Making the Most of Summer Movies

By JAMES R. OSWALD

Even in rugged terrain like this, a tripod is essential for rock-steady pictures.

A yellow filter makes possible cloud scenes such as this one. For dramatic, stormy effects, a red filter emphasizes the clouds still more.

THESE are the days when every red-blooded individual is beckoned by the great outdoors to forget the woes of winter, lay aside the gin rummy, don some summer sportswear, and "hit the road" to new adventure. In normal times this might mean getting out the old fishing tackle, purchasing that new fly rod, and retreating to that peaceful trout stream in the North Woods. It might also mean knocking off a week or two from the office, packing some luggage in the family car, and hitting the trail for the mountains, the seashore, or maybe just a restful stay on the farm. This year, however, because of manpower shortages, gasoline rationing, and one thing another, these distant trips are going to remain just "day dreams" to most of us, for the time being, to be appreciated and looked forward to all the more when they can be realized. But these restrictions need not prevent one from taking a short, week end jaunt to the country for a little fun and relaxation. Even an "A" card holder, with careful planning, can afford to take such trips.

To every real "dyed-in-the-wool" movie fan, the cine camera is an essential part of the luggage on any journey, whether it be a cross-country excursion or merely a Sunday afternoon's outing. In capturing the highlights of their adventures on film, those who take full advantage of their picture taking opportunities will have more than just pleasant memories of these happy occasions. That's why such filming is a "must" for every alert movie maker.

In view of the fact that vacation time is here, and even the casual filmer is taking his cine camera down from the shelf, dusting it off, and preparing to do his summer shooting, it might be well at this time to go over some of the "dos" and "don'ts" of home movie making, in an attempt to avoid those old pitfalls which were resolved to be overcome in this year's filming.

Dispensing with the more fundamental requirements of good movies, including proper threading of the film, which is amply explained in the camera's instruction manual, and correct exposure, which is simplified by the use of various guides or an exposure meter, the thing that ranks next in importance is steadiness . . . steadiness assured by a tripod, not by a seemingly firm hand. Jumpy

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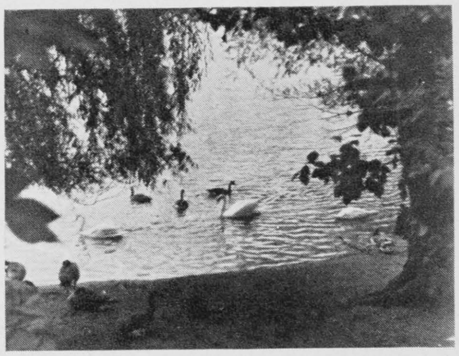


The local park or zoo offers more possibilities, without traveling great distances.

The city's bright spots also provide interesting shooting after dark.

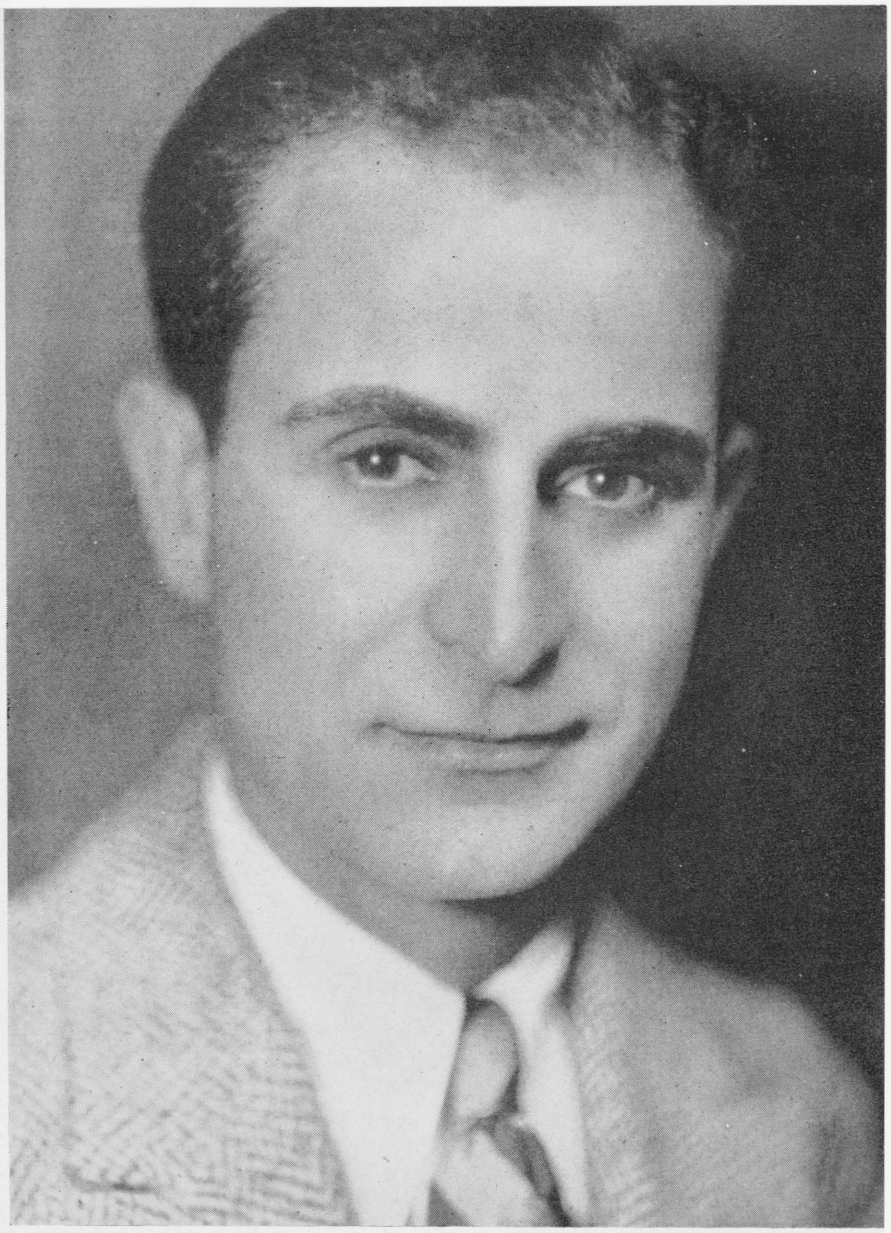
Sunsets are an old favorite for cloud lovers. Here again a filter should be used to bring out all the beauty of the scene.

Picnic gatherings should not be overlooked as worth while movie material right near home.

Scenes like this lack sufficient action to make a good movie. They are better reserved for snapshot albums.

Movie Tricks Explained

By PHIL TANNURA, A.S.C.



EVERY time I talk with an amateur movie maker he invariably winds up by asking how he can do various tricks with his camera to obtain the same results he so frequently sees in professional pictures on the screen. Contrary to general belief, many of the camera tricks are quite simple to do—if you know how.

The editor of the American Cinematographer asked me to explain a few tricks for the readers of the magazine. So, here are a few which I hope will be helpful to all home movie makers. If the readers find these are useful, from time to time I shall try to tell you more.

Reverse Action

One of the easiest of all camera tricks --and one of most help for slapstick comedy—is reverse action in which everything appears to happen in reverse: men run backward, automobiles glide ghostlike backwards around a curve through traffic, or water comes out of a glass into a pitcher.

If you have a camera with a crank, you get this reverse result by cranking the film backwards. If you have a spring-driven camera you simply hold the camera upside-down when shooting. Then after your film is developed, cut out the scene and replace it in the reel right side up. You do this by turning it end for end.

Simple, isn't it?

I recommend this only in the case of 16mm, and not for 8mm, because the smaller film has only one row of sprocket holes when ready for projection, and when the film is reversed end-for-end the emulsion side is turned away from the lens and throws the picture out of focus.

Making People Disappear

Another simple, yet effective, trick is stopping the camera to make people and inanimate objects appear and disappear.

Never try to do this unless you have your camera on a tripod. It is also important that you have as near static a background as possible, and for your actors to hold a given position while the camera is stopped.

In achieving this effect you film your scene normally up to the point where you want a person or object to vanish or appear. At that point you tell your players to "freeze" in their positions as you stop your camera. While the camera is stopped you remove whatever you wish to vanish. Then you continue the normal filming of your scene.

Much fun can be obtained by the substitution of one object for another, such as replacing a cup of tea with a bottle of beer, or a Ford sedan for a Rolls Royce. Try it out and you will have real fun after you have practiced it a few times.

Bombing Effects

In these days of war and air raids, some ambitious amateur may want to make a war picture showing the effect of a bomb or other explosion in a house. This can be done with a minimum of danger to your furniture and with great screen effectiveness without wrecking your room.

Just place a metal pan on the floor close in front of the camera. In the pan put a little old-fashioned flash powder. When you are ready for your explosion ignite the flash powder. When the smoke from the powder has obscured the camera's view, stop the camera. Then you scatter the furniture around to suit your fancy. Break lamps or glassware, or do what you want. When your room suits you, ignite some more flash powder in the pan, and as the smoke is clearing resume filming. On the screen you will see the flash of an explosion, a huge cloud of smoke, followed by a wrecked room. It's really very simple.

Distortion

If you wish to get a shot of a scene or individual slowly becoming blurred and distorted you do it this way.

Put a piece of optically flat glass (the type good filters are made of) in your filter holder or matte box. Start shooting your scene normally through this glass. When you want the distortion to start you simply spread some warm sweet oil along the top of the piece of glass and continue filming. The oil will flow down over the glass and as it does the scene becomes more and more distorted.

Some excellent nightmare scenes, or scenes such as an inebriated gentleman might see, can be obtained in this simple manner.

Making a Train Wreck

If you would like to make a picture of a railroad train leaving the tracks you can do it quite easily—and without wrecking the train.

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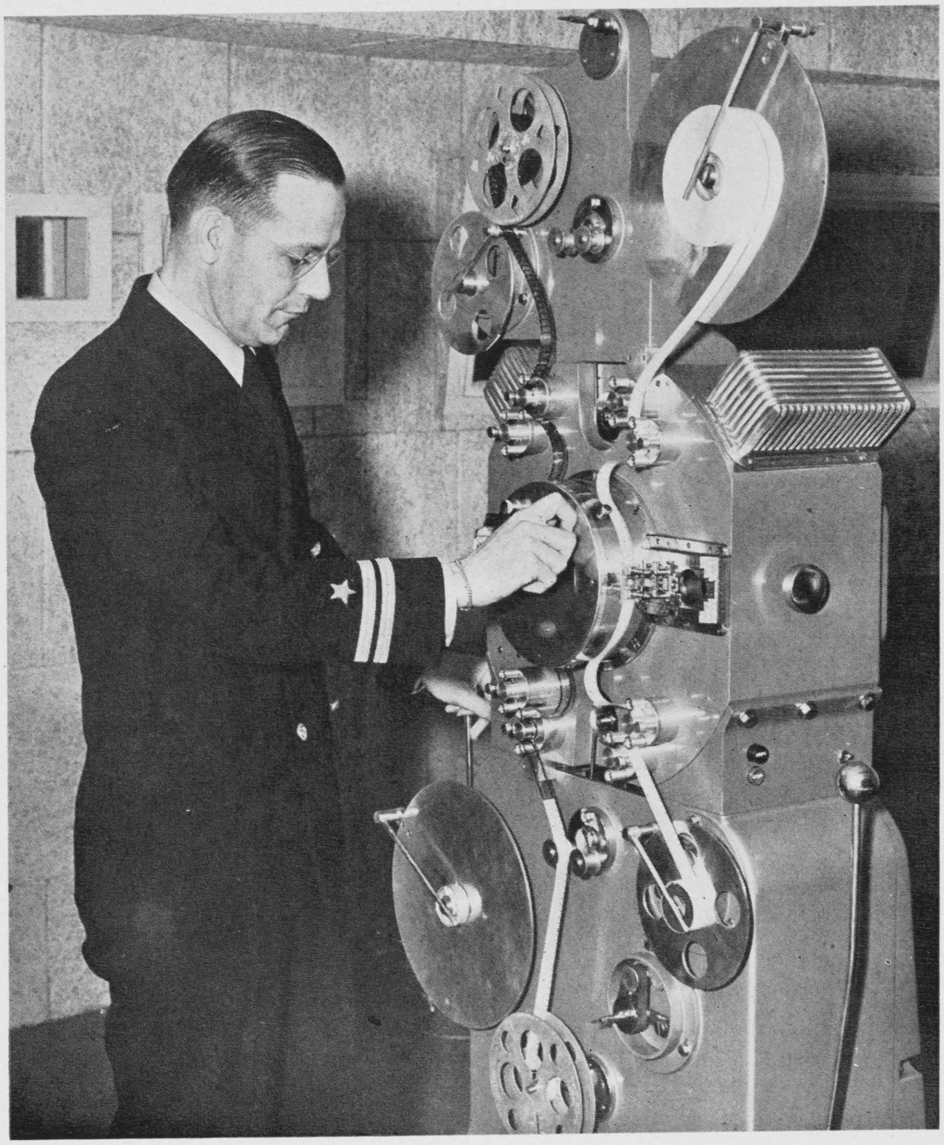

Left, Lt. Gordon Chambers of the Photo Science Laboratory, Bureau of Aeronautics, U.S.N., examining the new optical printer developed by Irving D. Dyatt Productions.

A New 16mm Optical Printer

By JACK HARTLINE

UP IN Corvallis, Oregon, a new high precision 16mm. optical printer has recently been unveiled by Irving B. Dyatt Productions.

Mr. Dyatt, who operates a combined motion picture production unit and research laboratory, has spent the past two and a half years studying the needs of processors in the 16mm. field, and the printer incorporates features and refinements suggested by processors and laboratories in all parts of the country.

Originally developed to make color-corrected Kodachrome master prints, the printer is a versatile machine with a wide variety of features. In addition to straight optical printing, with light correction, it may also be used for contact printing, either step or continuous; simultaneous double printing; traveling mats; and special effects.

Perhaps the most interesting feature of the printer is its principle of radial or rotary motion. Negative and raw stock travel on opposite sides of a circular assembly, making possible the absolute focus necessary to perfect optical printing. Since both films run through comparatively long radial channels, side motion and "whipping" are eliminated without any harmful "pinching" of the film edge.

The pull-down mechanism is concentric with the arc of the film track, thus preventing any possibility of damage to sprocket holes. Negative and raw stock are engaged simultaneously by cam-operated pins on opposite sides of the same rocker arm.

Accuracy of registration is provided by the pilot pin assemblies. Either two or four pins may be used on each side for single- or double-perforated film, and interchangable pins are provided to accommodate the slight variations in sprocket hole dimensions of film from various manufacturers. In contact printing, the pins enter from the raw stock side, thereby overcoming any shrinkage of the processed negative.

The pressure plate assembly is designed for simple and accurate threading. Framelines may be corrected by precision built masks operated by convenient knurled knobs at either side of the printer assembly.

Light source for optical printing is a 1000-watt lamp housed behind the printer assembly and cooled by a blower with a capacity of 650 cubic feet per minute. Separate air ducts are provided to cool the printer mechanism.

Light intensity is controlled by a galvanometer and enters the film aperture from a highly accurate front surface mirror. Duplicate lamp assemblies are provided so that light may be introduced from either side.

For straight contact printing, the lens assembly is removed and a light source placed at the center of the radial printing assembly. This evenly illuminates both apertures, making it possible to print simultaneously from both sides, from either one or two negatives, depending on how the machine is threaded.

In double or special effect printing, the negative (or Kodachrome original) is threaded in contact with the raw stock at one side of the machine while a second negative or mat is threaded through the opposite side.

Light control switches are integral with the sprockets feeding the film from the reel to the printer, eliminating the need for extra loops or sprockets. Threading is simple and fool-proof. The film is simply looped over the sprocket between idlers and a shoe swung into place. Take-up reels operate on the slipping belt principle.

To insure the extreme accuracy demanded by present day professional 16mm. work, the machine has been built to the highest standards of optical and mechanical precision. All important mechanical parts are held to a tolerance of not more than .0002", and the pilot pin and pull-down assemblies to .0001". The main body of the printer is constructed of meehanite, aged eight months and normalized three times. Front and back surfaces are ground to parallelism within .0005". Gears, which run in a bath of oil circulated by a gear-driven pump are centered to an accuracy within .0005".

A special model for 35 to 16mm. reduction or 16-to-35 enlargement is also in production. Except for modification of one side of the printer to accommodate 35mm. film, its operation is identical with that of the 16-to-16 model. The double lamp assembly feature makes it possible to change over from reduction to enlargement by simply using the other light source.

Experiments by an Army Cameraman

(Continued from Page 229)

These tones can be placed on the straight line portion of the curve in a number of different places. Remembering our geometric progression, we find that these tones can be expressed as 1-8, 2-16, 4-32, 8-64, or 16-128. A stopped-down lens will use the 1-8 portion of the straight line. If it is opened up more, it will use the 2-16 part of the curve, and so forth until the 8-64 and the 16-128 sections are used. Analyzing this we find that with a brightness ratio of 1-8, five different lens stops will give a printable negative. The 1-8 negative will print on one of the lower lights, say 1 to 5, and the 16-128 ratio will print on one of the higher lights, say 16 to 21. To put this in different terms, the 1-8, 2-16 ratios, etc., can be expressed in terms of Weston readings as 1.6-13, 3.2-25, 6.5-50, 13-100, etc.

If the scene contrast is Weston reflected $\frac{3.2}{200}$ (1-64), the exposure must be more exact as this ratio will fit into the straight line portion in only two spots, 1-64 or 2-128. However, if the scene is lighted so that the lowest reflected reading is 1.6 and the highest highlight has a reflected reading of 200, then the exposure must be perfect as the ratio here is 1-128 and it will fit into the straight line portion in only one place. A slight underexposure will place part of the tones in the toe of the curve between A and C resulting in a negative with some of its shadows going black. A slight overexposure will place some of the tones in the shoulder between B and O resulting in a negative having the brightest highlights blocked up. A study of the gray scale in Figure 2 illustrates this point. It is for scenes of this type in which the entire tone range of the film must be used that a good system of exposure control is mandatory.

Now study Figure No. 1. If the cameraman can so judge his exposure so as to place the middle tones at M, which is the middle of the straight line, he will be able to work from the middle out. He will have the area from M to B to place his highlights, and the area from M to A for the shadows. Let's see how this can be done.

As mentioned before, the characteristics of the H and D curve depends on the film, the development, exposure, and the amount of light. All of these are variables, and the changing of any of these will result in a change in the final positive print. However, we can assume that when shooting only one type of film will be used and at only one stop, say *f* 2.8. As the modern day labs always strive to develop to a constant gamma, we can disregard this factor. Therefore, of the four variables, film, exposure, development, and light intensity, we have crossed out three as being constants, leaving one variable which is the intensity of the light falling on the subject which in turn creates the different densities on the film.

As mentioned before, the laboratory technicians determine the H and D curve by plotting the logarithms of exposure against the densities of the film. This is of no practical use to a cameraman, so the next problem is to be able to plot these densities against some factor that will help the cameraman in his work. Experiments proved that these densities can be plotted in terms of Weston reflected readings or Incident readings in foot candles. When this is accomplished, we can obtain the limits of a particular film at a particular stop and development, so that the cameraman will have a basis for judging the amount of light to place on the set. In other words, we are trying to determine a method by which the cameraman can keep in a straight line portion AB shown in Figure No. 1.

The method used here to determine this was to set up and photograph a white card, using the film and the stop normally used by the cameraman. Plus X Film at *f* 2.8 was used in these experiments. This particular emulsion happened to be one stop slow, so cameramen trying this with fresh film will obtain slightly different results. A card with a matte surface was used as it gives a more even reflected light than one with a glossy surface. The camera was placed so that the white card filled the frame. Next, a light was placed in order to get a .8 Weston reflected reading from the white card. At the same time, the incident reading of this light was obtained. This was slated and the camera started. The minute it was up to speed it was stopped as only one frame of exposed film is necessary. The light was then moved in until the reflected reading of 1.6 was obtained off the card. This again was photographed. The light was then moved in until a 3.2 Weston reflected reading was obtained and this too was photographed. Each time the light was moved in until reflected readings of 13, 25, 50, 100, 200, and 400 had been photographed. Each time the incident reading of each light was noted and recorded.

The results gave a negative having a very slight density starting at a reflected reading of .8 progressing up to a very heavy density at Weston 400 reflected. The average density of one frame from each of the series was read on a densimeter and plotted against the Weston reflected readings as shown in Figure No. 2. Be sure to read a frame that was exposed after the camera was up to speed. Next, the straight line portion AB was determined, and a line dropped down from A and B to give the limits of the film in terms of Weston reflected readings. In this particular case, the limits of the film run from a low reading halfway between 1.6 and 3.2 to the high reading halfway between 100 and 200 Weston. For convenience sake, we will call these readings 13½ and 100½. In other words, any white surface photographed with a minimum reflected reading of 1.6½ to a maximum reflected reading of 100½ will be on the straight line portion of the film. But dropping down from M, we find that a reflected reading of 13½ will place tones in the middle of the straight line portion of the curve.

The next problem is to determine the correct intensity for the average key light. In order to determine the key, a subject whose face had average coloring was placed in front of the camera. Using the same film and stop as used in the other experiment, he was photographed. No fill or back light was used. First a key light of 64 foot candles, (only one light is used) or any other low key that the cameraman wishes to start with, is used. In these particular experiments, keys of 64, 100, 125, 150, 200, and 250 foot candles were used, as read by a De Zur meter. Each time using a Weston meter the reflected reading of the face was taken. The film was developed and all the scenes printed on the predetermined light. In these experiments, light 14. The print was projected and the key that gave the best tones to the subject's face was selected. In this case, the 150 foot candle key was the best. The Weston reflected reading of the subject's face was found to be between 13 and 25 with a key of 150 foot candles across the face. Referring back to Figure No. 2, you will see that M, the middle of the straight line, has a Weston reflected reading of 13½. This bears out the contention that the tones of the human face normally fall in the middle of the straight line portion.

Now for the practical use of this. When photographing a set we know that if using the same film and F stop as in our experiments if we place a key of 150 foot candles on a subject's face we have placed our middle tones in the middle of the straight line portion and can be assured of our negative printing on the predetermined light as mentioned before —light 14. This gives us a starting point. Let's assume a scene in a large deep cellar with light concrete walls in which a shaft of sunlight is shining through a high window, illuminating a small portion of the set but leaving the rest of it in deep shadows. An actor is in a corner at a table and his face is illuminated by a lamp on the table. The corners of the room are to be held as dark as possible, but with still enough light throughout so that its features are barely distinguishable.

Referring to Figure No. 2, we see that if the lightest highlight is just under B, it is on the straight line portion. Dropping down to the incident readings on the scale, we find that an incident reading of about 300 foot candles will put this highlight just under the shoulder

(Continued on Page 246)

THROUGH the EDITOR'S FINDER

JUST a year ago this month I was called in to edit the August issue of the CINEMATOGRAPHER when William Stull passed on very suddenly. At that time I had no idea I would continue editing the magazine, for I was swamped with my own Public Relations business and was compelled to work nights and Sundays to meet the press deadline.

But here is my twelfth magazine, and I must say I have enjoyed the editorial task. Editing a magazine is an exciting adventure, for the Editor never knows whether the contents of the magazine will please or displease its readers. He has to follow the current trends, guess what the readers want, and then try to get it. And in these days of war he is faced with the problems of lack of manpower in the engraving and printing plants. Finally, he must please the owners and publishers of the magazine.

From all parts of the world I have received scores of letters from subscribers that have made me very happy. Strange as it may seem, only one subscriber has complained about editorial content in the last twelve months. For those kindly letters I thank you, one and all. I only hope that the future issues of the magazine will continue to please you.

AS this is being written thousands of American boys are offering their lives in Normandy in the fight against a way of life that a former paper hanger has tried to inflict upon an entire world . . . a way of life that does not meet with the Democratic system which has been ours since the founding of the United States of America.

As this is being written other thousands of American boys are spilling their blood in the South Pacific to prevent the war lords of uncivilized Japan from inflicting their way of life upon us and the peoples of the Far East.

As this is being written politicians are girding their loins for a convention at which they will nominate a man to run for the office of President and one for Vice-President of these United States. When the Republican convention is over there will follow the Democratic convention. And then will follow the battle on the "home front". A battle for what? For the destruction of Hitlerism? For the destruction of Japan? For the freedom of small nations to be independent? For the right of every man, woman and child in the world to freedom of worship, speech, thought and want?

I wish I could say "yes" in answer to each of the above questions. But I cannot. Judging from the speeches I hear over the radio, and by statements issued by the politicians in whose hands are the destiny of our country, the battle will be for a political party. The Democrats want to remain in power, and the Republicans want to take their places.

In Germany and Japan the verbal attacks of each party upon the other will serve as builders of morale. A German city will be wrecked by American bombs, but the people will take comfort in the fact that there is strife and dissention on the American home front. The Allied Nations have confidence in the American government with which they have been cooperating. We are winning this war, and our Allies have faith in our leaders. But will that faith be so great once the politicians start telling the world that our leaders are doing a bad job; that they should be replaced by Republicans who will do the job right?

I am holding no brief for the party now in control. My interest is in the winning of the war and the wiping out of the way of life that our enemies want to inflict upon us. My interest is in those American boys who are dying, losing their legs, hands and eyes on the land, the sea and in the air so that America and the world may enjoy that freedom to which every human being is entitled.

And so my heart grieves when I see politics assuming more importance than the war in this great Democracy. True, because this is a democracy we have the right to bring up political issues at home while our boys are dying on the field of battle. But my simple brain cannot understand men who wish to take time out at a period such as this to further the cause of a political party.

Were those boys, wading ashore amid a hail of bullets on the beaches of France, fighting for a political party? Were those paratroopers who landed behind the German lines doing it for the Democratic or Republican parties? Were those boys, who crawled through the stinking jungles and mud of South Pacific islands, battling for Roosevelt or Wilkie or Dewey or Bricker?

No, thank God. They were fighting for America.

Let us hope that the political leaders in the coming campaign will be like our boys in the service—that they will fight, not for political office and soft political jobs, but for the United States of America.—H. H.

1944—

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AMONG THE MOVIE CLUBS

Rasch the Winner

After nearly a year of planning, the first Inter-Club contest between the 8-16 Movie Club of Philadelphia and the Philadelphia Cinema Club was held on the evening of June 13th.

Four films were entered in the contest. The winner was "Tally Ho," a picture of activities at a famous hunt club by A. L. O. Rasch of the Philadelphia Cinema Club. Mr. Rasch received a silver cup. All entries were in Kodachrome with recorded sound.

Pocatello Club

The third meeting of the Pocatello, Idaho, Camera Club was held on June 5. A Constitution and By-Laws were adopted and officers and members of the Board of Directors were elected.

Officers elected were: J. A. Tolman, President; T. H. Gathe, Jr., Secretary-Treasurer. Members of the Board of Directors chosen were: Evelyn Enenback, Dr. E. V. Simison, Frank Disdier and Y. D. Black. President Tolman appointed the following as a Program Committee for the next meeting: Evelyn Enenback, R. E. Brown and George Long.

Grand Rapids Club

The Grand Rapids Amateur Movie Club of Grand Rapids, Mich., has inaugurated a service that should make many fathers in the Armed Services happy. Club members are making movies of babies born while their fathers have been overseas. Scenes usually include baby being weighed, bathed, playing, retiring and a view of the youngster fast asleep.

The film is shown to the proud mother and other members of the family, and is then shipped overseas to the father. The family furnishes the film and the club shoots the pictures and has them processed.

New York Eight

Two hundred and fifty 8mm. enthusiasts gathered in the Salle Moderne of the Hotel Pennsylvania, New York City, for the Guest Night of the New York City Eight Millimeter Motion Picture Club. It was the most successful event the club has ever staged, with the guest list reading like the social register of 8mm. filmers.

The program opened with "Home Movies", a satire on the nuts and bolts of moviedom. This was followed by "Shell Hunt". Next came "Kid-napped", "Canadian Holiday", "Ten Pretty Girls" and "V—for Vacation".

Long Beach Anniversary

The Long Beach Cinema Club celebrated its 7th anniversary with a gala meeting the first Wednesday of June. The program consisted of "Horseback Holiday", "Vacation Wonderland", "An Ancient Art", a newsreel and the premiere of "Unexpected Escort".

Members have been invited to bring their equipment to the next meeting to shoot a story which will be complete with titles in one roll. This will be a "school" meeting for members who want the experience before taking part in the annual outdoor picture.

Another 7th Anniversary

On Monday evening, June 19th, members and guests of the La Casa Movie Club of Alhambra, California, celebrated the 7th Anniversary of the founding of the club. A total of 14 films were screened on the gala occasion. Eight of these were 8mm. pictures, five were 16mm. and one was 35mm.

Films shown were: "Yosemite", "Kellogg Arabian Horses", "Reno Vacation," "Cavalcade of the West," "California", "Good Old Days", "Mesa Verde National Park", "Cow Branding", "Yosemite" (another version), "Death Valley", "Pinto Ponies", "Griffith Park Zoo", "Flowers" and "Africa", the 35mm. special.

San Francisco Club

Highlighting the June meeting of the Cinema Club of San Francisco was a showing by Miss Gladys Broderson of Kodachrome slides of the Supai Valley in the Grand Canyon country. This is the Havasupai Indian Reservation, through which Cataract Creek flows to join the Colorado.

At the same meeting "Russian Easter," a 900-foot Kodachrome subject by George W. Serebrykoff, was screened. The theme of the picture is Easter in Nature, the Church and the Home, centering around the little Church of Alexander Nevsky in New Jersey.

Club members had so much fun on their recent Zoo Field Trip that they are now contemplating a field trip to Mt. Tamalpais.

Utah Cine Arts Club

The June meeting of the Utah Cine Arts Club proved unusually interesting. Martin Strom presented "My Trip Through McKinley Ward," and Kermit Fullmer gave a Parallax Demonstration. There was splicing practice for members, and the evening was completed with the showing of two color films on Mexico, "Yucatan" and "Mexican Moods."

Santa Ana Club

Fifty-two members of the 8-16 Movie Makers Club of Santa Ana, Calif., attended the June meeting which was just a bit unique. The meeting opened with a "pot-luck" dinner. A meat dish was served by the club, but members had to bring the rest of the meal.

After dinner and dish-washing a three-reel subject, "Rice," was screened. It is the life story of a Korean peasant, and was furnished the club by the AMERICAN CINEMATOGRAPHER.

Westwood Movie Club

The Executive Committee of the Westwood Movie Club has announced that the club will hold its third annual Gadget Exposition on Friday evening, Sept. 29, at the club headquarters, St. Francis Community Hall, San Fernando and Ocean Avenue, San Francisco, Calif.

A temporary committee has been set up to organize plans for the event. Clyde Wortman is Exposition Chairman. Assisting him are Edna Spree, Eric Unmack, Joe Pissott, Don Campbell and Jesse Richardson.

Los Angeles Cinema Club

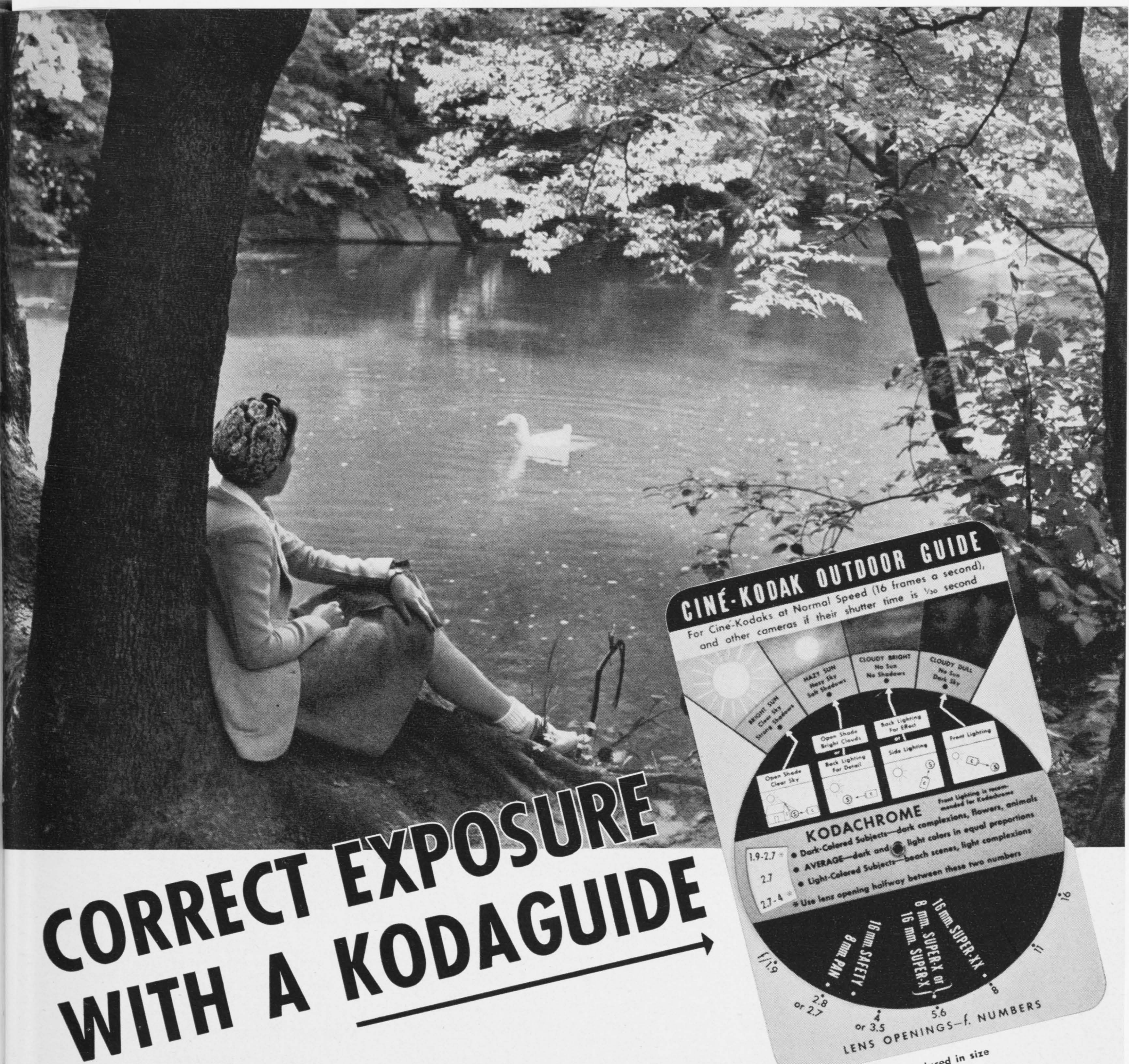
The June meeting of the Los Angeles Cinema Club was held in the Bell & Howell auditorium, 716 No. La Brea, Hollywood, and included the showing of two films and a collection of Kodachrome slides.

Pictures screened were: "Autumn in California", a Kodachrome subject by William L. Easley, and "Eighteenth Century Life in Williamsburg, Virginia", a rare Kodachrome Documentary film of great charm. It was furnished by the Eastman Kodak Company. The slides shown were of California flowers, and were made by Lester J. Turley.

M. M. P. C.

The Board of Directors of the Metropolitan Motion Picture Club has unanimously re-elected the entire panel of club officers for another year. They are: Leo J. Heffernan, President; Joseph J. Harley, 1st Vice-President; Frank E. Gunnell, 2nd Vice-President; Alice L. Burnett, Secretary, and Sidney Moritz, Treasurer.

The club's June meeting was held in the Walnut Room of the Hotel Capitol, New York City. Three films featured the meeting. They were "Sport Film" by Edwin Roth; "Sternwheeler Odyssey" by Sidney Moritz, and "Swinguette" by Mrs. Ford R. Jessop.


CINÉ-KODAK OUTDOOR GUIDE
For Ciné-Kodaks at Normal Speed (16 frames a second), and other cameras if their shutter time is 1/30 second
BRIGHT SUN Clear Sky Strong Shadows
HAZY SUN Hazy Sky Soft Shadows
CLOUDY BRIGHT No Sun No Shadows
CLOUDY DULL No Sun Dark Sky
Open Shade Clear Sky
Open Shade Bright Clouds or Back Lighting For Detail
Back Lighting For Effect or Side Lighting
Front Lighting
KODACHROME
Front Lighting is recommended for Kodachrome
1.9-2.7 * • Dark-Colored Subjects—dark complexions, flowers, animals
2.7 • AVERAGE—dark and light colors in equal proportions
2.7-4 * • Light-Colored Subjects—beach scenes, light complexions
* Use lens opening halfway between these two numbers
16 mm. SUPER-XX
8 mm. SUPER-X or 16 mm. SUPER-X
16 mm. SAFETY
8 mm. PAN
f/1.9
2.8 or 2.7
4 or 3.5
5.6
8
11
16
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Kodak Indoor Guide for Black-and-White Films: Dial calculator for Kodak Super-XX, Plus-X, Verichrome, and Panatomic-X with Photoflood and Photoflash lamps. 10c.

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Kodak Home Lighting Guide: Dial exposure calculator for Kodak Super-XX Film under ordinary home illumination with still and movie cameras. 10c.

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Kodachrome Indoor Guide, 35-mm. and Bantam: A dial calculator for use with Kodachrome Type A and Photoflood and Photoflash lamps. Gives information on lighting and exposure. 10c.

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Eastman Paper Kodaguide: Gives the relative speeds of papers, selection of contrast, image tone, safelight, developing, and toning data. 10c.

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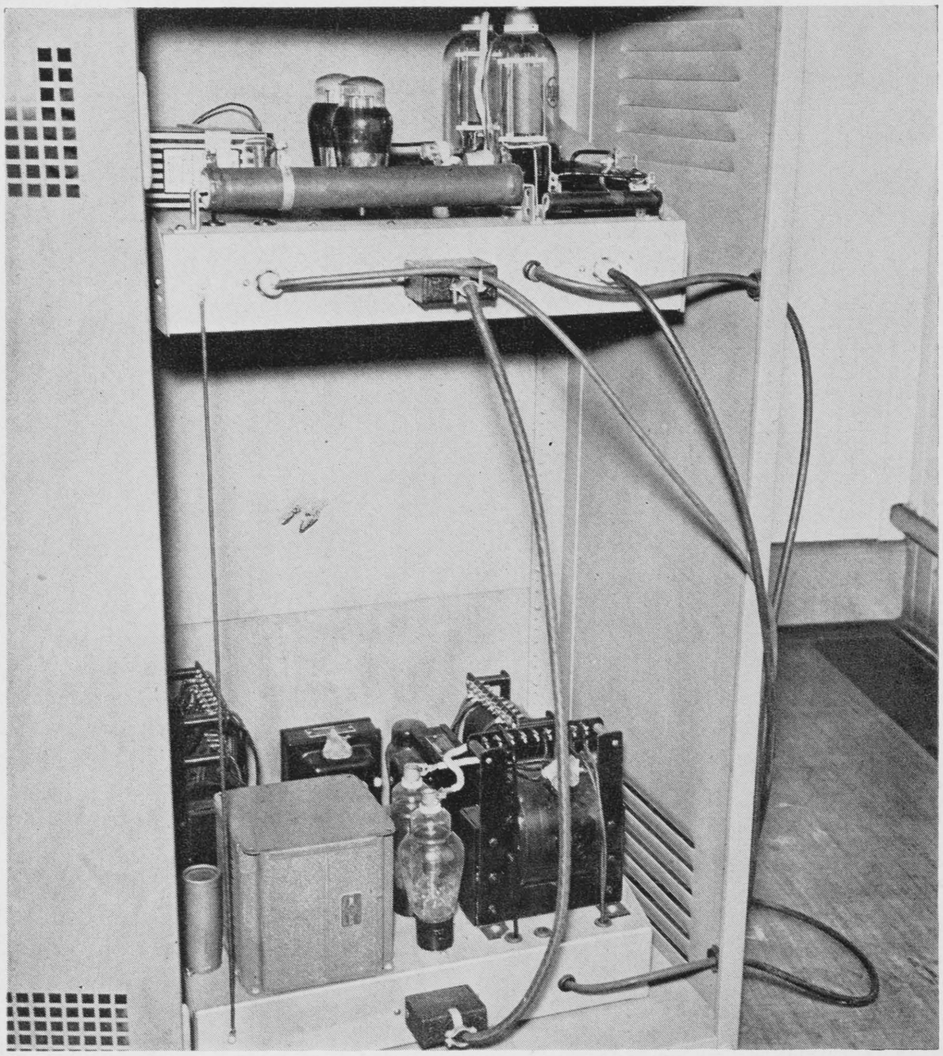
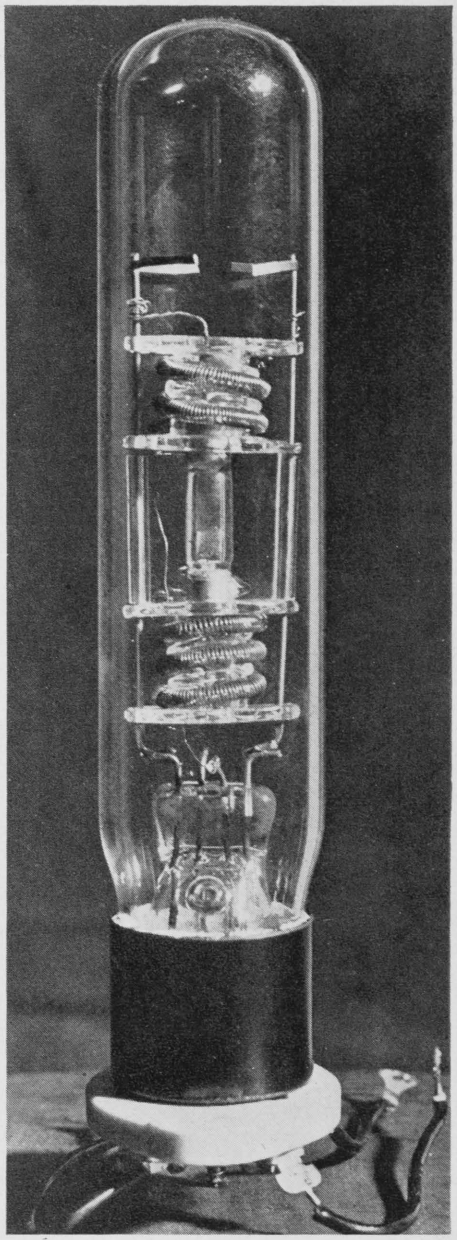
New Mercury Vapor Lamp Announced





Above, new type of mercury arc lamp. Left, electronic control apparatus housed in a cabinet. This is used with modulating light in motion picture film and photofinishing processes.

A NEW modulating light consisting of a high-pressure mercury vapor lamp with associated controls has been developed in the research laboratory of Hanovia Chemical and Manufacturing Company, Newark, New Jersey, after three years of experiments.

The new light, for which patent application has been filed, provides "a perfectly steady light as a source for printing sound track on film." The associated controls, it is announced, "automatically adjust the light intensity to various levels for the printing of photographic films, especially those used in motion pictures."

Created on demand of the motion picture industry, the new device has other applications in the fields of photofinishing and of processing microfilm, where a steady light source whose intensity can be readily controlled is a definite requirement.

Credited with the development work is Lester F. Bird of the Hanovia Laboratory. Bird perfected new circuits for the control apparatus, working under license on patents previously obtained by James R. Balsley, consulting engineer of Stamford, Connecticut. Bird also developed a new type of mercury arc lamp operating on 85 watts input with specially designed heater coil to permit operation within a wide intensity range of from one to ten. This device replaces incandescent lamps previously used which are much less efficient in the photoactinic range and produce a hissing sound on film track, according to Bird.

Bird explains that the light with its associated controls provides more light output per watt input than was previously possible and thus insures greater efficiency for photographic purposes. The added heaters prevent the mercury vapor pressure from falling off while the lamp is being operated on low intensity. It thus becomes possible to increase the intensity from low levels to maximum output, practically without any time delay. So flexible is this light that it can be changed instantaneously from low to high intensities and vice versa.

Electronic control of the light is provided through the use of electronic tubes and photoelectric eye so arranged that film densities automatically change light intensity as required.

Burton Holmes Films To Bell & Howell

The entire library of educational and travel films produced and long distributed by Burton Holmes Films, Inc., of Chicago, has been transferred to the Bell & Howell FILMOSOUND LIBRARY.

The original negatives, many of them photographed personally by the eminent lecturer, Burton Holmes, on his world travels and explorations, have been put into the custody of the new distributor, and all orders will henceforth be printed from them. Sale and rental prices remain unchanged.

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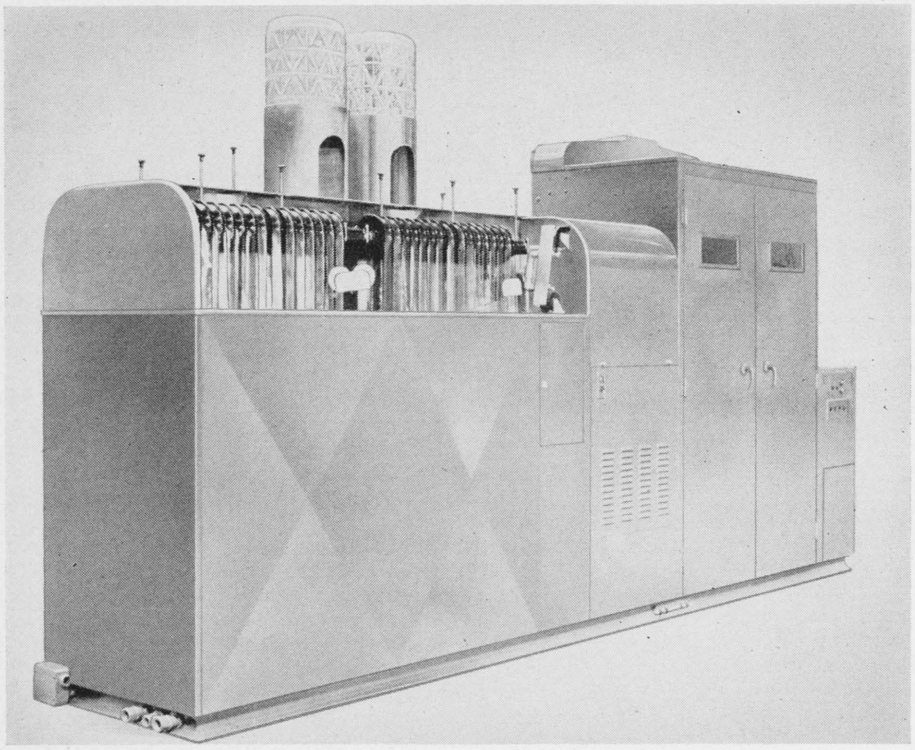
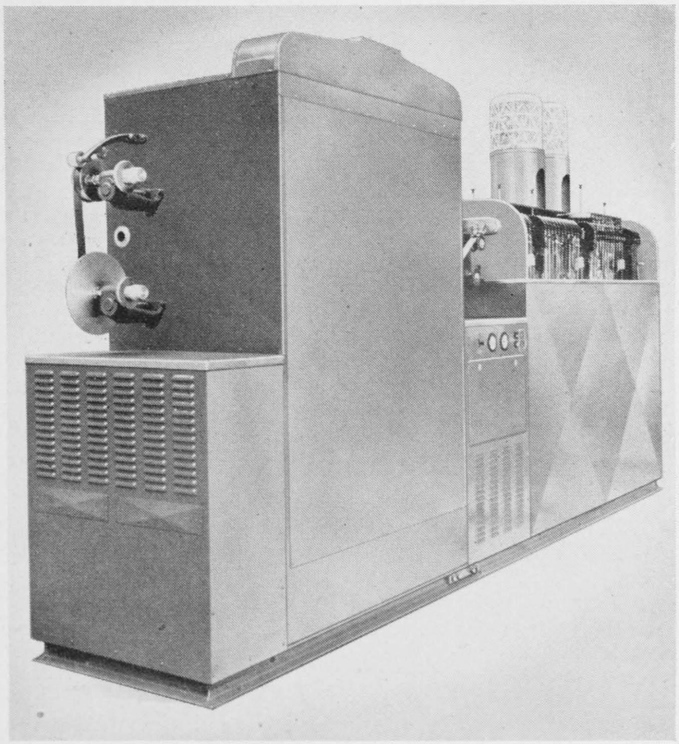


Wash tank side and drying cabinet



Take-off and developer side

The
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This 35 mm. processor is for negative and positive developing. Completely automatic, processing ranges from 6-12 minutes of developing time for negative and 3-6 minutes of developing time for positive. Output 600-1200 feet of negative per hour, 1200-2400 feet of positive per hour.

FROM CAMERA TO SCREEN—HOUSTON

Motion Picture Studio and Laboratory Equipment—Developing Machines—Printers—Camera Cranes and Dollies
Miniatures—Mechanical Sets—Engineering and Design Work—General Machine and Jobbing Work

Agricultural Motion Pictures in North Carolina

(Continued from Page 227)

rect sequence, but only rough cut, and shipped to a commercial lab in New York for a one-light positive black and white print.

Upon return of both original Kodachrome and the B. & W. work print, the latter was cut into shape, according to the sketch-script and a few minutes longer than the planned length of the final version. The length of each scene, was written down opposite each sketch and the accumulated time (from the start of the picture) also noted. This schedule is turned over to the specialist to base his narration on and with the general instruction not to figure on more than one hundred words a minute of running time. As often as not, however, it has proved quicker to have the cameraman write the narration himself, as by this time he knows the subject well enough, and merely have the specialist make corrections and suggestions as to the scientific subject matter involved.

The narration is double checked from time to time of course with the projected work print, and after many a hectic session resulting in a little pruning here and a little adding there, the super-final-final version is reached. With this o.k.'d by all the other specialists and officials concerned, and the combination sound and work print working smoothly,—the original Kodachrome is taken out of hiding (everyone wants to see it rather than the B. & W. and it practically has to be hid), and matched exactly to the work print. Then it is projected for the second and last time as a double check, and we are ready to score the narration in the usual manner. This we do in a commercial studio in New York.

It might seem easier to write a narration first and then make up a sequence of pictures to fit it exactly. In a pure nuts-and-bolts picture, one dealing purely with method where every action involved can be studied previously and reproduced each time, and where there is no outside continuity to be carried, this may well be possible. But in most other cases it has never turned out to be practical,—there are too many variations between the visualized picture as it is planned in the office and what actually takes place in front of the camera.

There is another reason that is important too,—it originated in Washington. The complaint was made that many agricultural bulletins put out for the nation's farmers used wording that was over the head of the average farm reader. Consequently it was decided right at the start of the program that while the information given in the motion pictures would adhere very closely to that carried in the complementary bulletin, the actual words used would be in as near basic English as was practical. This was most easily effected by having a person other than the specialist write the narration.

Our picture "Repair It Now," tells of two farmers taking the day off to go hunting. They invite a third to join them but he is busy repairing the combine and straightening up his tool shed, which he proudly shows off. The capers of three "hound" dogs lighten the story and when finally the two hunters turn to go, one of them is conscious-stricken and returns to his own farm to work. Various pieces of equipment and the mistreatment of same are worked into the story which winds up with the day of reckoning for the third man, or villain. The subject of farm machinery did not involve the problems of nature that cropped up elsewhere, (such as the photographing early in the year of corn harvesting, or the availability of a day old calf on a day when the weather was favorable), but being the first picture actually shot, it did point up the number of technical problems that could be expected in future pictures.

"Our Garden" tells the story of a typical farm-family garden and how it is planned, started, and kept producing. The actual family selected had a reputation for always having had an excellent garden, but this year Dame Nature decided otherwise and sent them late frosts, and hail storms and droughts that all but eliminated picture making, and those crops that did mature to any degree of beauty did so when the camera was off on some other assignment.

"Carolina Cows" is a trite phrase for a picture title on dairying, but that latter word is not so easily worked in either. This subject could include so many different angles (clean milk, proper feed, breeding, management of herd, etc.) that it was decided to treat it in a general way. The continuity of the story was carried by two 4-H boys, the elder of whom took in charge a newcomer to the country, showing him around and telling him about dairy farming in different parts of the State.

"Raise 'Em Right" deals with hogs and emphasizes the importance of cleanliness, or sanitation as the expert says. The story tells of a young farmer who decided to follow the advice of his county agent and give up trying to raise "scrubs" (non-pedigree stock) in a small and dirty lot, in favor of investing in a bred-sow purchased from a recognized dealer. The porcine heroine is treated just right according to all recommendations and she emerges with an octette and a grunt of satisfaction. The progeny is shown growing to the stage where some are set aside for breeding, some for fattening for market-sale, and some for home slaughter. As an interesting contrast one of the poor type hogs purchased the previous year is found dead and a pocket knife used in Jack-the-Ripper style leads to an autopsy that shows the tape worms wriggling out of the intestines.

"Can All You Can" is a straight forward canning demonstration showing the use of the pressure cooker and the boiling water bath method. There is no story involved and the pictures were all made in an actual demonstration kitchen; none of the equipment used however cost over a dollar, although the newly painted walls and cabinets, plus the standard white kitchen tables, did have the effect of glamourizing the set nearly beyond recognition.

"Home Drying" (dehydration) was shot at the same time as the above canning picture and was originally planned as part of it. However the combination of the three food conservation methods would have run the entire picture close to forty minutes, twice as long as any non-entertainment picture should be,—in the writer's opinion at least. The fact that dehydration is not considered to be as good a food conservation practice as canning, was another reason for avoiding the division of interest it would have caused if included in "Can All You Can."

A seventh picture, on backyard poultry raising (for farmers' rather than city folk) is currently being shot and has involved a considerable amount of building with raw timber cut down in the farmer's own woods. This was done not so much because of the shortage of lumber in this part of the country but rather to demonstrate that it was not necessary for a man to put out cold cash for purely practical equipment. In this story, the Extension Service's Poultry Specialist had to take the part of the principal, as the farmer on whose place most of the shots were made was himself crying for help. The shooting of day-old chicks involved some delicate timing due to the hatcheries' one day a week schedule; and the pictures of two sets of birds on range put the motion picture department into the poultry business because of the necessity of buying the chickens of a certain age, shooting the pictures, and then selling the birds on the open market to reduce the expenses incurred. No self respecting poultryman, regardless of how cooperative he might be towards the picture program, would loan his birds if they were to be moved away, due to the possibility of their picking up a disease and bring it back with them.

Other pictures of interest to North Carolina, and in fact all Southern farmers, are being planned and various sequences on widely divergent subjects photographed for stock use. The distribution of these pictures is handled by the Extension Service Staff in conjunction with agricultural organizations throughout the State. There are sound projectors in nearly every fair sized community and money for scores of other machines is on the line just waiting for the lifting of wartime restrictions.

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EASTMAN FILMS

Utah Amateurs Celebrate

Above we see the members and guests of the Utah Amateur Movie Club of Salt Lake City attending the club's Eighth Annual Banquet, at the Lion House Social Centre. Judge J. G. Jeppson was toastmaster, and Dr. S. K. Robbins was chairman of the commitee on arrangements. The club has a limited membership, and has many interesting projects under way. Assisting Dr Robbins in arranging the successful affair were Pauline Scott and Mrs. D. H. Cameron, club secretary.

Movie Tricks Explained

(Continued from Page 231)

Set up your camera on a tripod at a spot where you know the train is going to stop, with your camera placed so the engine will fill the frame when the train stops. As the train approaches begin shooting. Then, just as the engine completely fills the frame and stops, you jerk one of the tripod legs suddenly sideways and continue shooting. When you see it on the screen it will look as though the engine had come right off the track.

You can add other shots of the cars, making them look as though they were piling up, too. BUT, remember this: In making these shots you much have your camera at an angle which does not show the ground.

That should be enough tricks to work on for a while. If you have trouble making them work, write me in care of the American Cinematographer and I'll try to straighten you out.

Making the Most of Summer Movies

(Continued from Page 230)

pictures are a major fault of amateur movies and a detriment to otherwise good films. The remedy is so simple that carelessness is the only excuse for this error. It's true that a tripod is a bulky, cumbersome piece of apparatus, but results will far overshadow the little inconvenience caused by its clumsiness.

Those who like to capture those beautiful, fluffy-white cloud formations in their scenic shots (and who doesn't) will want to consider a color filter an essential part of their equipment. A filter acts to cut down on the overabundance of blue light in the sky, permitting the white clouds to register on the film. This balancing of light values is referred to as the *correcting* power of the filter. Since yellow is the complementary color of blue, to which black and white photographic film is especially sensitive, a yellow filter is the appropriate one to use to hold back this excessive blueness of the sky, at the same time allowing other shades to pass through, in varying degrees, thereby recording the scene more nearly as the human eye sees it. The deeper yellow the filter, the more the correction. A red filter overemphasizes the clouds, creating a dramatic, stormy effect, with deeply darkened sky. Color filters are for use exclusively with the black and white film, in which case they merely render the scene in its true black and white equivalent, so far as color values are concerned. Kodachrome, being a natural color film, requires no special filters at all, except in very rare cases, and then only those prescribed by the manufacturer should be used. Ordinary color filters must never be used with Kodachrome.

It's a common tendency among many to cut scenes short, leaving only a fleeting glimpse of action on the screen, often not recognizable. Likewise, all too frequently film is wasted on shots containing no action whatsoever . . . shots that are better reserved for a snapshot album. Anything worth recording with a movie camera is worth recording the best possible way . . . for the proper length of time . . . from the most advantageous angle.

Keeping these little reminders at hand will go a long way toward improving vacation movies. This is the time to pack the cine camera, chuck a filter or two in the pocket, and not forgetting the tripod, "hit the trail." The great outdoors is beckoning . . . heed the call!

PH-346-A Recording Equipment

(Continued from Page 225)

two motors are on the power panel in the recorder unit. Correct motor speed is indicated by a vibrating reel type tachometer mounted close to the volume indicator meter for the operator's ease in referring to it. Both motors are designed to operate satisfactorily over a voltage range from 18 volts to 25 volts to take care of variations in storage battery conditions.

Sound Track

The equipment as supplied records unilateral variable area sound track conforming to the nominal 35mm. standards with respect to track dimensions and location on the film. As previously suggested later adaptations can be made to produce other types of track as desired. When 35mm. film is used the track is the same as any 35mm. recording using track of this kind. When 16mm. film is used, the track dimensions and location with respect to the adjacent film edge remain the same as for 35mm. film. This choice for the 16mm. film was made to permit the use of 16mm. film on 35mm. reproducing equipment without changing film location, optical systems, etc. It is relatively simple to replace sprockets and rollers in most 35mm. reproducing heads with 16mm. sprockets and rollers having the same approximate diameter dimensions, thus permitting the machine to run the 16mm. film at 90 feet a minute very satisfactorily.

Modulator

The modulator now used in the equipment is the E. M. Berndt Corporation Auricon type galvanometer mounted in a special housing as shown in Figure 6. Noise reduction amounting to 6 DB is attained by a direct current bias of the galvanometer movement. This galvanometer was adopted because of its generally rugged construction and simplicity of operation. Arrangements are made for focusing and lateral adjustment of the light beam without requiring special and complicated optical test equipment. These adjustments may be very readily made in the field in case galvanometer replacement is required.

Space provision is made for the use of other modulator types as future applications of the equipment would probably require studio type modulators. The general design is sufficiently flexible to permit such adaptations to be made.

Amplifier System

The amplifier system is completely contained in one unit. This unit is mounted in the recorder unit in such a manner that it may be readily removed by removing four thumb screws and disconnecting a plug and jack. The unit is suspended on rubber shock absorbers which form a part of the slide mounts which are released when the thumb screws are removed. This removable feature is very important for field maintenance purposes. The amplifier is necessarily complex in its operation but normally the man in the field is not supposed to go beyond changing tubes if trouble develops. If this method of correction is insufficient, he can remove the entire amplifier unit and replace it with another.

The amplifier assembly contains a mixer for one microphone position, auxiliary gain controls, and a meter which is used interchangeably for checking the various circuit conditions, the recording exciting lamp current, and as a volume indicator or as a limiter indicator. Switches to connect the meter into the various parts of the circuit for its several uses are on the panel and on a sub panel accessible through a rear door. The normal maximum gain for the amplifier is 110 DB with an additional 15 DB of gain which may be used if necessary, but with a corresponding increase in noise level. This additional 15 DB is used without the increase in noise when the music equalizer is connected for use. The equalizer switch is also mounted on the rear sub panel.

Limiting action is provided in the amplifier corresponding to the type of limiting in normal use in studio recording. The limiting operation is a change in gain which occurs very rapidly (of the order of 1/10,0000 second or faster) on

(Continued on Page 247)

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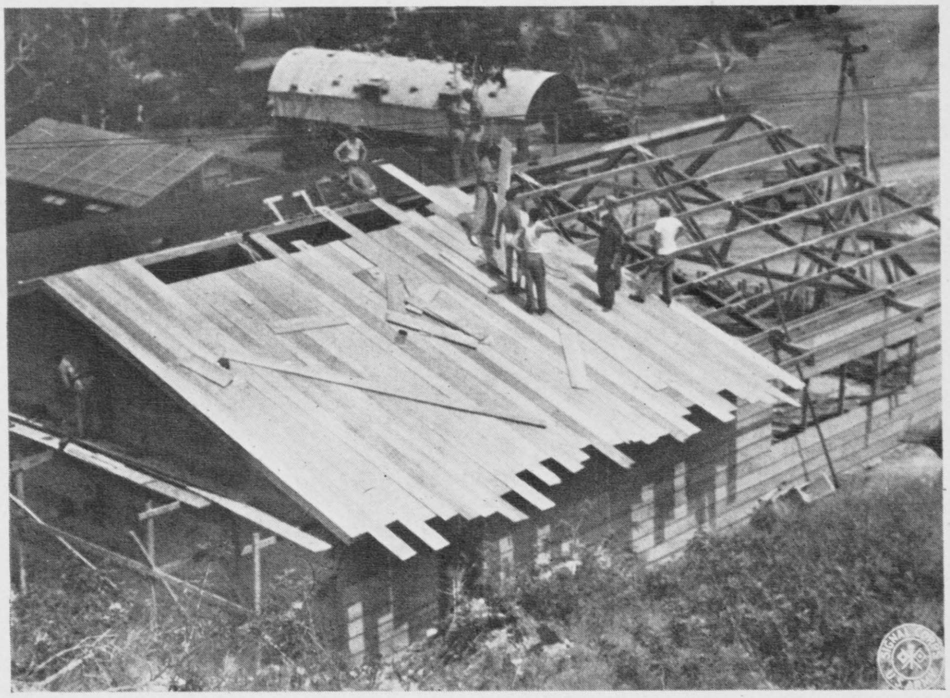

WHEN the 4th Signal Photographic Laboratory Unit arrived in the South Pacific recently, the great amount of motion picture film awaiting processing required the Unit to go into immediate operation. Without benefit of the usual precise measurement and control equipment, technician members of the Unit set up a minimum of equipment and were in operation three days after arrival at the overseas destination.

Working under conditions which would grey the hair of the orthodox laboratory technicians, the Unit processed an undisclosed but record amount of film during their first 30 days on New Caledonia. Developing negative in Stineman tanks, one 100-foot roll at a time, and printing with a modified Bell & Howell printer, film was processed in the hallway of a building made available to the Unit. Most of the work was done at night, because of reduced difficulties with lightproofing, although an army pup tent was pressed into service to cover the printer to permit continuous day and night operation of that equipment.

While one group of technicians was engaged in film processing, the remainder of the Unit temporarily became carpenters and construction men of all sorts, as it was necessary for the Unit to build its own building before going into motion picture production. With the supervisory assistance of a Seabee, a modern laboratory and studio building is now under construction, which upon completion will serve as base center for motion picture activities in the South Pacific area.

Although completely inexperienced in construction work, the men of the Unit, many of whom have spent their entire adult life as technicians in studios, are putting up a building which will be completely satisfactory for all purposes.

Major Gordon S. Mitchell, on leave of absence as Manager of the Research Council of the Academy of Motion Picture Arts and Sciences, is Commanding Officer of the Unit, assisted by Captain Raymond R. Windmiller, formerly of the Williams Laboratory in Hollywood; M/Sgt. William Claridge of Technicolor in charge of film processing; T/3 Malcolm C. Bulloch, formerly of Paramount, in charge of the editorial department; T/3 Herman H. Fischer, sound recording; M/Sgt. Clarence Perry, equipment maintenance; and Sgt. Frank L. Reed, still pictures.

Film Review

Review of film submitted by C. W. Wade, of North Hollywood, Calif. 200 ft. 8mm. Kodachrome—entitled, "V— For Vacation."

This film was probably made for a contest in his club, and is an excellent example of a genuine "home movie." The man and wife wish they could go somewhere, but spend their vacation at home instead, working in the yard, canning fruit, etc.

The scenes are well edited throughout, and assembled in logical continuity. Double exposed main and sub-titles are expertly handled, probably with the assistance of a wind-back attachment. The titles are nicely hand lettered in a legible white, large enough letters, well worded and centered, and not too long. The uniform sub-titles are cleverly double-exposed over a Liberty bell in low key against a dark background, and these sub-titles are adeptly cut in.

Exposures are uniformly good, composition of the scenes is pleasing, and the camera angles are varied and well chosen. An effective use is made of "background action," showing mother busily working in the background of several scenes, as man or wife are featured in the foreground.

The simple but interesting and topical story shows the couple resting in the backyard, wishing they could take a trip. But they decide to be patriotic and stay at home for their vacation. The wife starts to rake up leaves and gathers walnuts, but husband pitches golf balls until one strikes her on the leg. She insists that he get to work, so he tries to pitch walnuts into a box. He misses the box, of course, then she shows him how, with a bullet-eye every time. Cutting is particularly well handled in the sequence. Then they both shell walnuts and pack them into jars. A sequence in the kitchen, showing canning of fruits is well lighted, and continuity expertly edited. Outside again, the husband takes a ladder and climbs up on the roof, to sweep off the leaves, which is a familiar chore to anyone blessed and annoyed by walnut trees.

She tells him to stop loafing on the roof and come down and help her. He comes down but uses a clever gag of going out into the yard to work, carrying the garden tools in his golf bag. He rakes leaves for awhile then leans on his rake, apparently dreaming about something. Here, and elsewhere, he makes good use of a chemical fade, and dreams of some previous vacations, inserting a few good scenes of trips taken.

After the dream of other vacations, they sit down again, but recall there is one thing they have not done, which is to buy War Bonds—A War Bond poster is then shown, followed by a clever sequence that is evidence of the filming ingenuity of this producer. He is seen making out checks, then comes some expert double exposures of tanks, planes and guns against a dark bockground, as War Bonds float down. The climax comes when a Jap flag is burned up.

This is well conceived and efficiently executed "home movie," completely titled, and should rate high among the top entries of any contest.

EDWARD PYLE, JR.

USDA Promotes Lindstrom

Appointment of Chester A. Lindstrom as chief of its Motion Picture Service is announced by the Department of Agriculture. Mr. Lindstrom, who has been associate chief of the Service, succeeds Raymond Evans, who retired recently.

The Motion Picture Service, a part of the Department's Office of Information, produces and distributes motion pictures based upon the results of agricultural research and the wartime agricultural programs.

Films Spur Sperry Workers to Action

DWARFED as it is by the amazing record of home front production, it is easy to overlook the substantial contribution to factory morale and personnel training that is being made by 16mm. sound-films. Typical of such large companies that have found uses for motion pictures is the Sperry Gyroscope Co. of Brooklyn, N. Y., where thousands of new workers have to be taught the skills of precision instrument makers as quickly as possible. Many of these workers are women who have not held jobs in industry before; few can boast of previous experience in the operation of machinery; most have never before been inside a large factory.

As part of their introduction to their new surroundings, all new employees are shown the motion picture "You are Sperry," which consists of 1200 feet of film with appropriate spoken commentary that is intended to provide answers to many of the questions an employee generally wants to ask about the organization. Thus some of the feeling of strangeness that goes with a new job is dispelled, and the uncertain anxious-to-please new-comer is given confidence because he is made to feel informed.

"You Are Sperry" introduces company executives; it tells in simple, straightforward fashion the aims and policies of the company; it takes the new-comer on a tour of unrestricted manufacturing areas. Always the greatest emphasis is upon people, the men and women who do the work.

After the new employee has been processed, his training for his job begins and is speeded by the use of sound movies. Many of the films used in this phase of his indoctrination are from those prepared by the United States Office of Education and designed to teach machining skills. Included are short features that teach lessons in how to avoid accidents, how to administer first aid in case of accident, and how generally to take care of oneself around moving machinery.

United States Signal Corps and Navy films for exclusive showing to war workers are also run off for the benefit of all employees. These stress the importance of the task of producing war weapons and point out the necessity for regular and consistently good work.

Sperry has 20 sound projectors to take care of the filmed part of the company's indoctrination program. These are kept busy at all times.

16mm. motion picture films are also making an important contribution to Sperry research engineering. They are an invaluable means for keeping records and they permit restudy of pictured experiments as often as the engineer wishes. They are a modern and useful tool.

Ford Facts

Ninety thousand pounds of amminium sulphate—enough to fertilize 225 acres of farmland—is produced each day in the by-products plant of the Ford Motor Company at Dearborn.

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Klinger Joins PFC

Walter Klinger, business manager of Metro-Goldwyn-Mayer's Short Subject Department for the past ten years, has resigned to join The Princeton Film Center. Klinger assumes Production Manager's duties in new affiliation.

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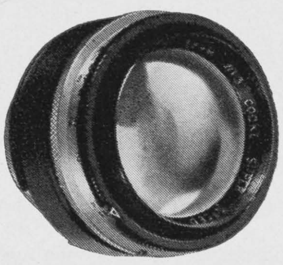

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Experiments by an Army Cameraman

(Continued from Page 233)

of the curve, just under B. Therefore, a sun arc is shot through the window at 300 foot candles. This means that no matter what it hits, a white paper, the star's face, etc., it will never be so strong that it will result in a blocked-up highlight. The cameraman knows that if an actor walks into this shaft of light in order to read a paper that he will get a good rendition of tones throughout.

Now for the room. As stated before, we want the light held down so that the objects in the room are just distinguishable. Again referring to Figure No. 2, we see that a Weston reflected reading of 3.2 will put these wall tones down near the toe of the curve at A. Therefore, the white concrete walls are so lighted that the Weston meter shows a reflected reading of 3.2 from the walls. Since these tones will be near A on the toe of the curve, the cameraman knows that he is on the straight line portion and will have deep transparent shadows that will not go black as they are on the straight line. Any darker objects in the room that should be pointed up a bit can be lighted and balanced up to be in keeping with the general wall illumination. The actor's face is keyed with a source light, the intensity of which can be judged by eye to be in balance with the rest of the scene. However, if there is any question in the cameraman's mind, he can make a mental reference to the test shots of the various key intensities made previously, selecting one he knows will give him the correct rendition of the actor's face. Fill and back light is then placed in by eye and the camera is ready to roll.

In this scene we have used nearly the entire tone range of the film running from deep transparent shadows to the brightest shaft of sunlight streaming through the window. At all times the cameraman knew where each tone would fall, making it unnecessary to resort to a hand test.

There are further uses of this scale as shown in Figure No. 2. For instance, the scene is in a livingroom with light grey walls. It is a daytime set. The cameraman can put in the sunlight by incident readings as pointed out in the scene mentioned previously. By placing his wall tones in the close vicinity of M he knows he will have a brightly lighted set, so referring to Figure No. 2, he knows that he can get this by having a reflected reading from the walls of halfway between 13 and 25 on the Weston meter. If it is a nighttime set, he can drop his normal tones halfway between A and M and let the shadows fall down to just above A.

As mentioned before, tests prove that this system works; however, there is quite a bit more experimenting to be done. The reader should carefully note that so far we have been speaking of taking readings off of surfaces that are white or grey. Anyone who has used a meter knows that it has quite a different response to a red surface as compared to one that is white. The same is true for film. Therefore, after the reader has tested out the above method of using a meter to check his light balance, his next step is to start experimenting to find a rule-of-thumb method for tying the system into taking readings off of colored surfaces. After studying the color response of a particular film as compared to the color response of the meter, the reader can experiment to find out if some general rule-of-thumb can be established for differentiating between the amount of light necessary for various colors. For example, to use a hypothetical case, tests might prove that if the walls are deep red that if the cameraman wants a minimum of detail, instead of having a minimum reading of 1.6 (the minimum necessary in the case of white walls) the reading should be at least 13. Following the line of thought, it may be possible to set up an easily remembered scale of differentials for the various colors likely to be encountered in various interior sets.

Delinquency Film Available

AS A CONTRIBUTION to the nationwide efforts to curb juvenile delinquency, the Aetna Life Affiliated Companies of Hartford, Conn., have produced a new educational motion picture entitled, "As the Twig is Bent."

This film is specifically directed to parents and carries the warning that boys and girls have even greater need for parental care and guidance under the strain of wartime living than when conditions are normal. With so many fathers in the service and with so many mothers devoting much of their time to war work, children can easily get into serious trouble unless adequate provision is made for their care. In communities where there is poor housing and lack of proper recreational facilities, the danger of juvenile delinquency is even greater.

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Coated Lenses

(Continued from Page 223)

sion is required in any other region such as the violet or the infra-red, the film thickness is adjusted accordingly.

How accurately can a film be made to conform to the theoretical conditions? The answer is—nearly enough to make it worth while to apply the process on a large scale. The square-root rule governing the refractive index of the film is not very critical and the same film material can be used with good effect on all the lenses of any optical system.

Formation of Film

Magnesium fluoride and the mineral cryolite both have refractive indices which are of the right magnitude to suit optical glasses.

Silica also is sometimes used, although it has rather too high a refractive index to suit ordinary glasses. Its advantage is that silica forms the very framework of the glass; the film can be formed by dissolving away the other constituents of the glass, leaving the silica skeleton undisturbed. The first experiments on anti-reflection films were made along these lines by H. Dennis Taylor[3] of T. Cooke & Sons, York, in the 1890's. Taylor was evidently the first to attempt to reproduce artificially the natural "tarnish" produced on lenses by the action of the atmosphere, having recognized its beneficial nature.

The fluoride films are deposited by volatilization in a high vacuum.[4] In this technique, "high vacuum" means a pressure of not more than one millionth of an atmosphere. When the mineral is heated to red heat at that degree of vacuum it volatilizes and travels in straight lines until it meets a cool surface, where it condenses as a transparent film. To make the thickness one quarter of the selected wavelength is a simple matter. The color of the reflection as a white light from the film can be seen to change as the film grows on the lens and the evaporation is stopped at the appropriate color. Some operators prefer to use a photo-electric measuring device.

It is safe to say that the great majority of lenses being treated at the present time are coated by the high-vacuum process.

Commercially produced anti-reflection coatings should be sufficiently robust to withstand the cleaning necessary in everyday use, provided that it is done in the right way. It is very necessary to keep them absolutely clean. A thin layer of grease will completely upset the optical constants of the film.

Efficiency of Coating

In attempting to give definite figures of the improved performance of coated lens systems, I find myself in the difficult position that most of the results which have come to my knowledge are not for publication. I can, however, say that it is not unreasonable to expect the reflectivity of a single surface to be reduced to, at most, 1½%. This means an increase of about 25% in the brightness of the image formed by a camera lens having 8 coated surfaces. It is obvious that reduction in glare and flare spots is greater in proportion than the increase in transmission, because glare light reaching the image plane must have been reflected at least twice. The reduction is therefore proportional to the square of the reduction of reflection at a single surface. The effect of coating a photographic lens is illustrated in Fig. 2.

There will undoubtedly be a demand for coated lenses when commercial production gets in full swing again, especially for the high quality lenses, and in systems where every millilumen counts the application will be essential. Finally, the elimination of the bogey of flare spots will enable the computer to proceed with a freer hand in his approach to perfection.

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1. K. B. Blodgett, Phys. Rev., 55, 391, 1939.
2. K. M. Greenland, Nature, 152, 290, Sept. 11, 1943.
3. H. D. Taylor, "The Adjustment and Testing of Telescopic Objectives." T. Cooke, York, 1896.
4. British Patent No. 538272.

PH-346-A Recording Equipment

(Continued from Page 243)

excessive peaks and restores much more slowly (about 2/10 second). It is set to operate very slightly above 100% galvanometer modulation level. The limiting feature is very valuable for consistent operation, as it controls maximum level, protects the modulator and in general assures the highest practicable recording level on the film. The meter is arranged to indicate limiting action, or if desired, it may be used as the conventional volume indicator.

Provision is made for the normal use of one Western Electric 618 type microphone only. If, however, two microphones are required an extension mixer is connected in place of the single microphone and two microphones may be connected through and controlled by the extension mixer.

Training Manual

The equipment is such that with the barest operating knowledge of sound recording reasonably consistent results should be attainable. Basic instruction and meter readings to check the operating conditions are given on an instruction plate on the cover of the mixer panel.

In addition a very detailed instruction booklet, Training Manual No. TM 11-2350, was prepared from which a complete working knowledge can be obtained.

The equipment as now in service fills a gap long felt in the complement of Signal Corps motion picture equipment. In contrast to the sound systems of ordinary newsreel cameras of the single film system type, this equipment gives results comparable to studio production.

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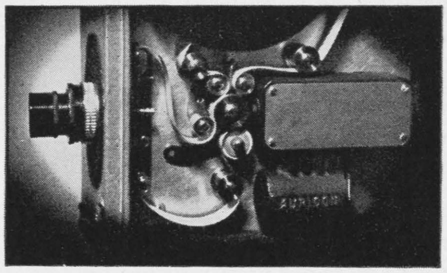

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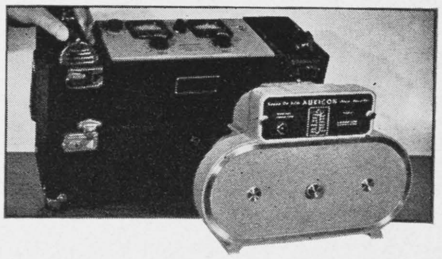

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Aces of the Camera

(Continued from Page 228)

thought he was fibbing; and so, in an unprecedented move, hired the renowned Jackson Rose to creep up on the old boy and catch him looking when he wasn't looking. They certainly picked the right man when they picked Jack. He had photographed too many film dramas (250 the papers said) not to know that many a man has been foiled in his schemes, nefarious and otherwise, by the sight of a pretty woman's—a-ah—ankle. And so he enlisted the aid of a budding young actress who, in the interest of justice, was prevailed upon to expose her seductive extremity while he got a shot of the "blind man" focusing his optics on hose. The papers record that it was an expensive peep for Mr. Zyla, although they neglect to say whether or not he thought it was worth it. Furthermore, they failed to mention whether Jack irised out on this shot or used his rising and falling curtain shutter.

In 1919, realizing the help it would be if cameramen out on location could develop and look at a piece of negative, Jack built and pioneered the first test box to develop film under location conditions. The original machine he built for this purpose didn't survive, but the idea did and it was another step in the direction of better pictures.

Incidentally, Jack has more than ninety patents to his credit for photographic attachments and devices he has invented during his thirty-four years in the business. He is a tireless researcher, delving into every phase of the art and science of photography. His work in color rendition on monochromatic film, done in 1930 on his own initiative, still remains one of the most comprehensive tests ever carried out. To complete it he shot tests with every type and make of raw stock, using every type of filter known to the industry, in daylight and under arcs and Mazdas, of every color in the spectrum; and every color was represented by nine shades. It took nearly a year to complete the test, but when it was finished it represented the first really comprehensive and scientific approach to one of the most fundamental problems in monochrome photography ever made. DuPont and Paramount were quick to recognize the value of such a work and each bought a set of the original prints, and the information turned up by the test was widely published in photographic magazines.

Another of his ideas was the "Cinema Focus Chart" which he brought out about the same time, and which every cameraman must have used at one time or another. Still another was the test kit, bought from him and distributed by Leica, with filter holder and sunshade for making hand-samples on location. All this, while in his spare time he was making prize winning still pictures that were being shown in salons all over the world.

His first trip to Hollywood was in 1916, when he came out here to photograph a picture featuring Max Linder, the famous French importation. But Hollywood as it presented itself to him in those days didn't impress him. He wondered why he had been sent so far to shoot a picture. And though Mrs. Rose, with feminine intuition, could see a wonderful future for our Sunny Southland, Jack couldn't see any future for any kind of business in a place so far removed from civilization.

When he went back to Chicago, however, he must have taken out some of the California Chamber of Commerce literature and reread it, because a couple of years later he came out again to stay. And when his wife asks him, in that way that women have, if he thinks Hollywood has a future, he grins sheepishly and goes into his laboratory to work on another gadget.

It was while he was in the east during that period that he made a picture he still remembers as the highlight of his experience. No ordinary film, it was called "Miles of Smiles," and consisted of thousands of feet, shot newsreel style in several of the larger Eastern cities, of the wives, mothers and sweethearts of the boys overseas. These pictures were then shipped to France and shown to the boys "over there" for Christmas. Jack says it was one of the most moving experiences he has ever witnessed. When the papers announced that the films were to be shot, in one of the local parks, thousands of women, carrying their children, would come and stream by the camera. Old ladies, some of whom had to be carried to the park, composed themselves and walked bravely past the camera so that their sons would see them at their best. The scenes of those whose loved ones were in hospitals over there were particularly touching as they forced happy smiles to their tear stained faces before presenting themselves to Jack's lens.

For the last 11 years Jack has been on the camera roster at M.G.M. With his penchant for the unusual he likes to get the assignments for difficult shots, and frequently succeeds. Joe Ruttenberg, A.S.C., had him make the night scenes

(Continued on Page 250)

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W. E. Reports New Sound Systems

E. S. Gregg, vice president of the Western Electric Export Corporation, has announced the completion of a new line of sound reproducing systems which embrace the many advances in technology evolved during the war. The new equipment will become available to exhibitors in foreign countries when materials and labor are released by the government of the United States, Gregg said.

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"Salad Bowl" Speaker Developed for Navy

THE demand by the Navy for a loudspeaker, that could rise to the occasion and satisfy the rigid requirements of today's great naval battles, has been met in a new speaker designed by Bell Telephone Laboratories and now being produced by the Western Electric Company. This high powered unit, sometimes called the "salad bowl" because of its shape, has passed the rigid Navy tests to insure reliable operation under the wide geographical range of the fleet's activities.

Designed for speech reproduction, this speaker has an outside diameter of 12½ inches and weighs approximately 25 pounds. The unit is composed of three principal sections: the base, which provides space for a transformer, and a terminal strip, and provisions for the lead-in cable; the horn, which is of the folded exponential type; and the magnetic unit which is fitted with a two-piece permanent magnet, and diaphram. The loudspeaker is constructed principally from formed sheet metal and moulded plastic.

The voice coil impedance of the unit is approximately 7.5 ohms. The speaker develops the high sound pressure of 50 dynes per square centimeter when operated at the rated electrical input and measured at 10 feet from the speaker on the sound axis in open air.

Other features of this loudspeaker are that it is resistant to shock, vibration, salt spray, gun blast, and is readily accessible for servicing due to its simple construction.

A New Wrinkle

Pictures go into politics with the plan just originated by Business Films, of Washington, D. C., for shooting one-minute election shorts of Senators and Representatives for local screenings in their constituent District theaters.

First to go before the cameras in this unique election year plan will be Jennings Randolph (D., W. Va.), Chairman of the important House District Committee.

Ideas of the producers is that the films will not only save Congressmen trips back home in the vital invasion year, but for the first time in the history of Congressional campaigning will present the candidate's complete political personality "in person" and on a mass scale, through a medium appealing to both the eyes and ears of his constituents, and which can't be turned off.

A number of prints will be furnished each candidate, enabling him to obtain simultaneous screenings in different constituent District houses. Cost of the shorts will run $300, including five prints. Pictures will be shot in the company's Washington studios, using newly installed RCA studio sound equipment. Newsweek Magazine reports the plan as "a new wrinkle in coming campaigns."

New Scenic Transparencies

More than 700 Kodachrome transparencies of superb photography and vivid coloring, comprise a collection of 2x2 slides of scenic points of interest in the United States, Canada, Mexico, Hawaii and Latin America, now available from DeVry Films & Laboratories, 1111 Armitage Avenue, Chicago. Each subject is covered by six slides, which are sold only in sets. Colorful literature is available free.

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Aces of the Camera

(Continued from Page 248)

for "Mrs. Miniver." For a year and a half, in what he looks back upon as one of the happiest experiences of his career, he worked out problems for Slavko Vorkapitch. His talents are also used to enhance the "Passing Parade" series, and the Pete Smith shorts.

In the opinion of his fellows, Jack's greatest work, and a most important contribution to photography, is The American Cinematographer Hand Book and Reference Guide, which he wrote and compiled. This book, which every cameraman owns and thumbs through regularly, is as necessary a part of a cameraman's equipment as a Baedecker is to a tourist. Containing every conceivable bit of information of a photographic nature, exhaustively covering every subject in the entire field from camera to screen, it is now in its fourth printing of the fourth edition. It has been supplied to every cameraman in every division of the Army and Navy; is used by almost every government agency with a photographic interest, by universities, and industrialists. A truly remarkable book, it is a monument to the painstaking genius of a man who has been an Ace of the Camera from the beginning, Jackson Rose.

New Filmosound Releases From Bell & Howell

HI BUDDY! (Universal). No. 2527, 6 reels. Excellent, timely comedy drama of the founding of an "off-the-street" club, and its decline, due to preoccupation of elders with war problems. Genuine entertainment, but based on current everyday affairs in a most appealing and realistic manner. (Dick Foran, Harriet Hilliard and an amazing cast of sub-teen juveniles.) Available from August 2 for approved non-theatrical audiences.

THE AMAZING MRS. HOLLIDAY (Universal). No. 2529, 9 reels. Deanna Durbin shows herself an outstanding dramatic actress as well as a fine songstress. The story sweeps from war-torn China, across the dangerous Pacific, to San Francisco's swank Nob Hill. A fine, human, humorous tale that, incidentally helps build better United Nations fellowship. Available from August 9 for approved non-theatrical audiences.

ROAR NAVY ROAR (Universal). No. 2598, 20 min. The story of the American Navy from the days of the wooden frigates to the super-dreadnoughts. How the Navy has kept our flag flying on the Seven Seas!

New Helicopter Film

"The Helicopter" is the newest in the series of aircraft motion pictures scheduled for production by The Princeton Film Center, Princeton, New Jersey.

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WESTINGHOUSE SYNCHRONOUS MOTORS, 3600 RPM, 220 V three phase, cost new $105.00, good condition, $57.50; Bell-Howell 220V three phase camera motor, $125.00; Berndt-Maurer 16mm Recording System, $1,995.00; 32V DC generator unit, 750W, automobile type, $29.50; Sunspots, 5000 watt on casters, $165.00; Optical Reduction Printer, Sound, $395.00; Picture, $625.00. Send for listings. S.O.S. CINEMA SUPPLY CORPORATION, New York 18.

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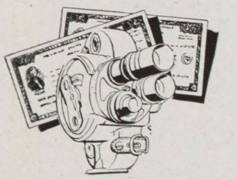

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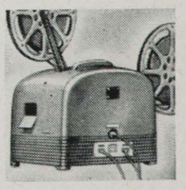

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